FACTORY

MANAGEMENT AND MAINTENANCE

JULY 1947

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A McGRAW-HILL PUBLICATION

IN THE MODERN OFFICE BUILDING OF JOHNSON WAX
JOHNSON'S WAX
BYERS WROUGHT IRON
IN A NEW TYPE OF HEATING
FRANK LLOYD WRIGHT, ARCHITECT
WESTERLIN & CAMPBELL CO., HEATING CONTRACTORS
Blazing a new trail in American heating practice, the heating system in the new Johnson Wax office building consists in part of thousands of feet of 1¼" and 2" Byers Wrought Iron pipe, imbedded in the concrete floor. Steam circulating within the piping will combine with tempered ventilating air to warm the structure.
The selection of Byers Wrought Iron for this service took into account the need for complete dependability . . . as no provision could be made for future access to the piping. Service records covering thousands of heating applications gave ample assurance that Byers Wrought Iron had all necessary qualifications.
Byers Wrought Iron is recommended only after the application of sound engineering procedure. If you will tell us your problem, our Engineering Service Department will, without cost or obligation: (1) Determine the probable corrosive conditions. (2) Relate these to kindred conditions existing elsewhere. (3) Interpret the results in terms of experience gained in three quarters of a century of contact with corrosion problems . . . and (4) Confirm the recommendations with actual service records.
A new Byers General Catalog has just been published. Ask for a complimentary copy.
A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Seattle, San Francisco.
BYERS GENUINE WROUGHT IRON
TUBULAR AND FLAT ROLLED PRODUCTS

Here's an Advertisement that started a *Revolution!*

This is the tenth anniversary of a revolution in heating.

In 1937, Frank Lloyd Wright, the famous architect, designed a new building for Johnson Wax. He included a new-fangled method of heating, in which coils of pipe, carrying the heating medium, were embedded in the concrete floor. The heating contractors, Westerlin and Campbell, recommended wrought iron for the coils.

Byers Wrought Iron pipe was used . . . and in line with its policy of informing designers and engineers of new developments, A. M. Byers Company ran an advertisement on the subject as the building neared completion. You may have seen it . . . but certainly would never have dreamed of how far-reaching its effects would be.

A flood of inquiries came from technical men, interested in the new method of heating. From this beginning in 1937 the Byers organization collected all available data, developed additional information, and put the result between covers in the first complete, authoritative bulletin on radiant heating. This—and succeeding editions, in which additional facts and findings were included—has been accepted as the "Bible" of radiant heating by thousands of architects, engineers, and heating contractors. In succeeding years, Byers engineers worked with hundreds of designers on specific projects, continued to gather data, and today have accumulated more *complete* and *practical* information on the subject than can be found anywhere else on the globe.

This "experience pool" covers information on the use of radiant heating in almost every type of structure: homes, churches, schools, hospitals, railroad stations, hangars, garages, brooder houses, theaters, telephone exchanges, laboratories, dog kennels . . . the list is far too long to itemize. This wealth of data provides practical answers to almost every question that can arise in connection with radiant heating . . . and it is available to all architects, engineers, and heating contractors interested in applying this modern method of heating.

It is significant that with thousands of installations already made, over 90% of those of which Byers has record have used Byers Wrought Iron pipe. Byers Wrought Iron pipe offers the exact combination of qualities and properties needed for radiant heating: ease of fabrication; high heat emission; almost identical thermal expansion characteristics with concrete, and proved resistance to corrosion. For a "progress report" on this ten years of radiant heating progress, ask for the booklet, "What we have learned from 1000 radiant heating installations."

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, Seattle, San Francisco.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

BYERS
GENUINE WROUGHT IRON
TUBULAR AND HOT ROLLED PRODUCTS
ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

50-foot collapsible straw for a 5000-gallon drink

A typical example of B. F. Goodrich development in rubber

EVERY minute of extra time on the ground by a 300-mile-an-hour airplane represents 5 air miles lost. Greatest waste of time used to be in refueling.

Hose big enough to fill a plane's 5000-gallon tanks in a hurry was too heavy — hauling 50-foot lengths of it up and over the plane took valuable time. So a smaller hose had to be used, which meant slow flow, with time lost in filling tanks.

B.F.Goodrich engineers, who had developed so many improvements in aviation, went to work on this problem. With their experience in designing hundreds of different types and sizes of hose for almost every purpose, they developed another one which was large enough yet light in weight. The real development was that this new hose is so flexible it can be collapsed and hauled up on the plane empty, gas pumped through, the hose drained by suction, and so lightened, collapsed and hauled off again easily and quickly.

With this new hose a larger size could be used — a plane could be filled in one-fourth the former time and so put into the air 20 minutes sooner — be 100 miles on its way in the time saved by the hose alone.

This is the sort of development B.F.Goodrich is constantly making, to improve its products and their value to all users. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich

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The Steel Rush of '47

Back in 1849, the cry of "*Gold*" sent a horde of men racing westward. Yes, there was gold in California—but not enough for all who hungered for it. Latecomers in the rush found themselves with worthless claims. Others found nothing at all.

Today the cry is for steel. After six long years of war, strikes and stoppages, an equipment-hungry nation is creating history's greatest demand for steel products.

Every day by mail, telephone and telegraph—a steady stream of orders pours into each of twelve great Ryerson plants. And, though steel production is now far above the pre-war level, the tremendous demand sometimes depletes our stocks. Often we are unable to ship many items on your order.

But, unlike the gold supply that faded before the eyes of the hapless Forty-niners, the supply of steel is being constantly replenished. Products out of stock today may be available the next time you check the nearby Ryerson plant.

And here at Ryerson trained personnel and the facilities of a complete Steel-Service system combine in a concentrated effort to deliver your steel requirements promptly. When the steel you need is not immediately available, we gladly assist you in the search for a practical alternate.

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FACTORY

MANAGEMENT and MAINTENANCE

JULY, 1947

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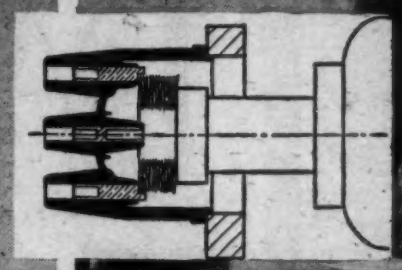
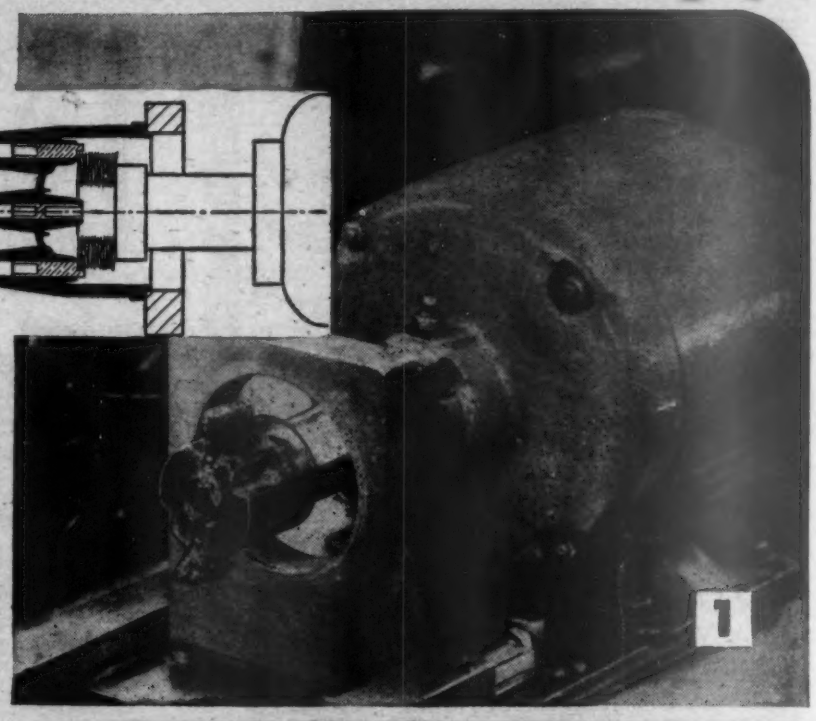
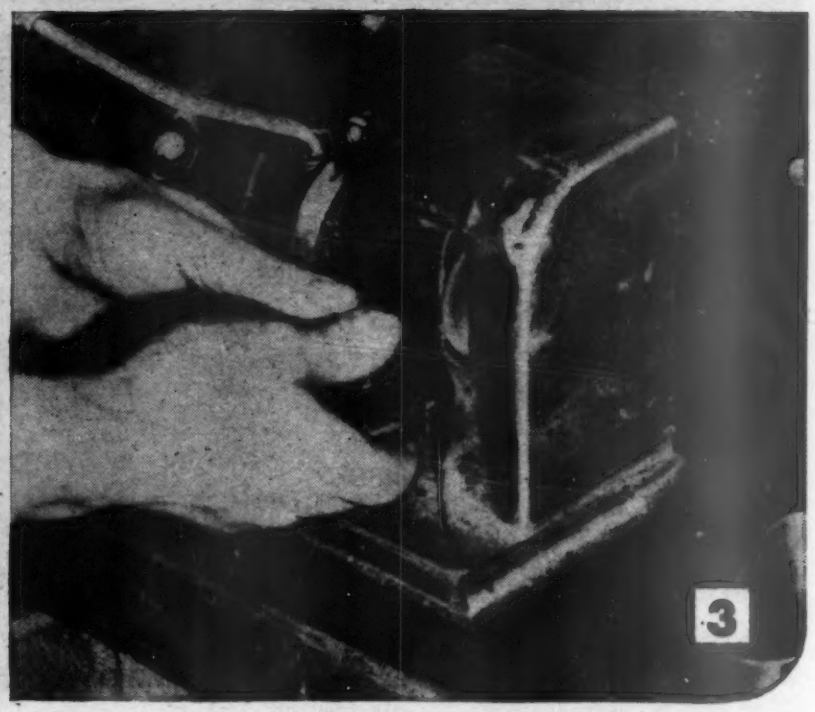
Brush away those *Small Job Headaches!*







EVERY plant has them—tedious, time-consuming jobs involving the cleaning and finishing of small parts and assemblies. Little jobs individually, but collectively costly operations that have an important bearing on the price tag of the finished product.

Scores of companies have adopted brushing as a solution to these small job headaches. A typical example is the West Pullman Works of the International Harvester Company, Chicago, which is devoted to small parts production for their wide line of farm equipment. Illustration No. 1 shows a special holder fitted with Osborn Situft brushes which removes burrs from terminal inserts inside tractor motor distributor caps. These inserts are almost impossible to reach by hand yet the job takes only seconds by brushing.

Removing varnish from magneto rotors and smoothing sharp edges with an Osborn brushing wheel is pictured in Illustration No. 2. And the little 2-inch Osborn brush shown in Illustration No. 3 cleans the secondary leadout of magneto coils.

Yes, they are little jobs but the savings made possible by brushing bulk up big on the cost sheet. Why not find out now where brushing can brighten your production picture? An Osborn sales engineer will gladly assist you in this analysis. Just say the word—soon.

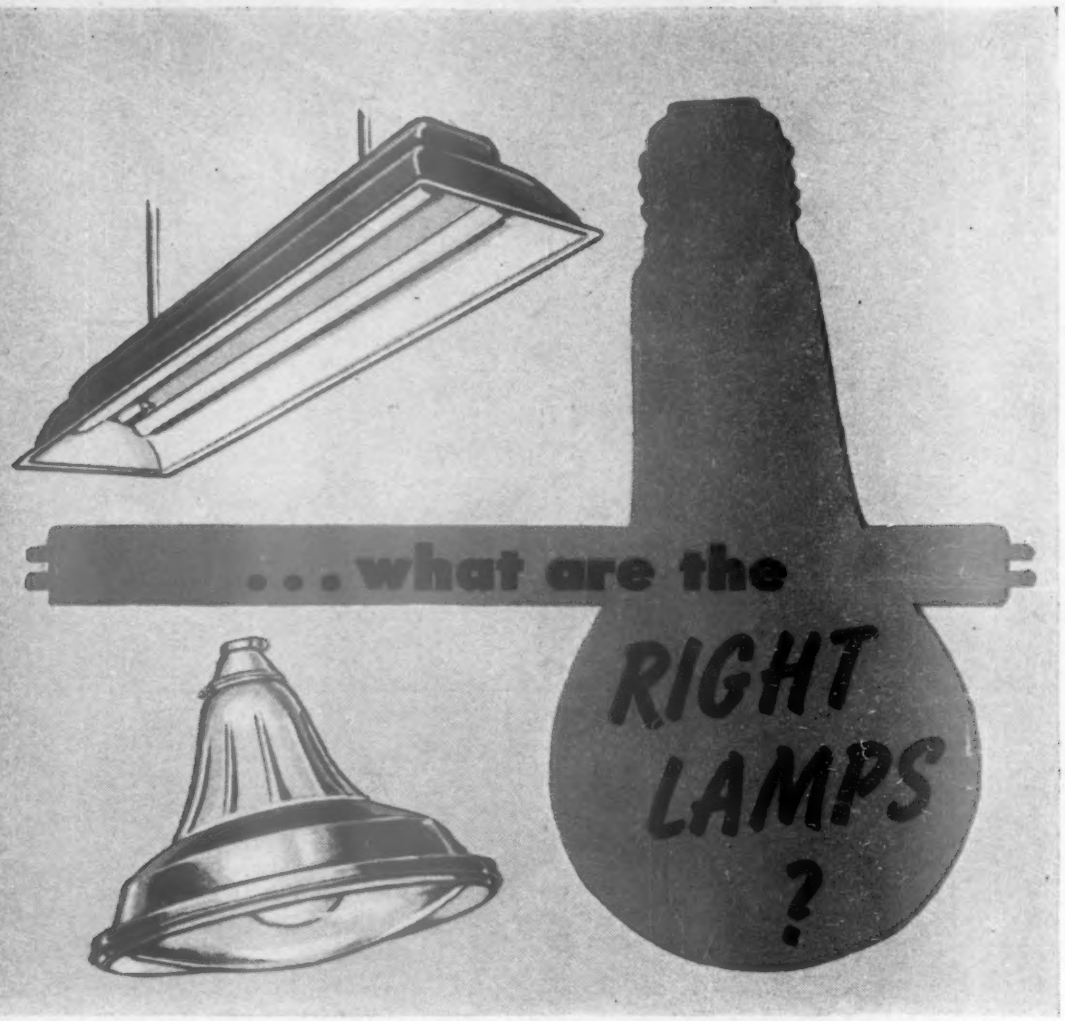
Osborn Brushes

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue *Cleveland, Ohio*

WORLD'S LARGEST MANUFACTURER OF BRUSHES FOR INDUSTRY

For your fluorescent or incandescent lighting



Graybar's near-by office distributes them

Under normal conditions at Graybar warehouses, strategically located throughout the nation, stocks of G-E lamps are maintained for prompt, local delivery. Graybar distributes *all types* and *all sizes* of incandescent and fluorescent lamps for indoor, outdoor, and product lighting — plus germicidal, infra-red, and other special lamps. A Graybar Lighting Specialist will gladly help you determine the best type and wattage of lamp for any requirement.

Although the lamps you want may not be available today, supplies are increasing, and we hope soon to be able to deliver any type of lamp — in any quantity — anywhere — on a moment's notice.

Whatever your lighting requirements, Graybar can impartially recommend the correct lighting equipment for your particular needs from the most complete selection of lamps and lighting units available from any one source. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.*

4757

TIME-SAVING
INFORMATION SERVICE FOR ELECTRICAL BUYERS

Whenever you need facts about one or several kinds of electrical equipment or supplies, call the near-by Graybar office. That's the quickest, easiest way to get the information you want. As distributor of the products of over 200 leading manufacturers, Graybar can give you catalog, price, and delivery information on over 60,000 electrical items. Graybar Specialists are prepared to supplement this information with sound recommendations on selection and application.

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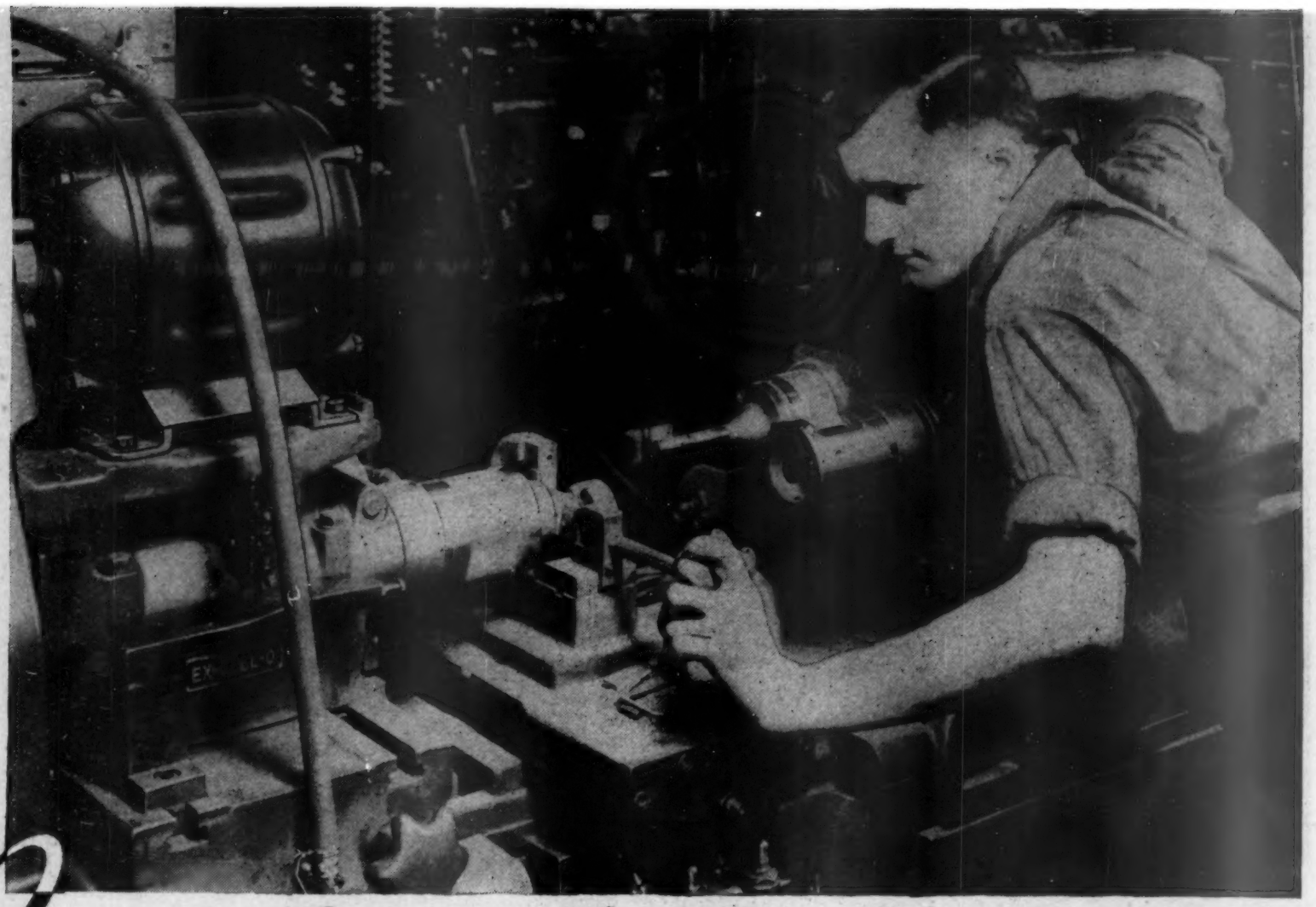
IN OVER 90 PRINCIPAL CITIES

WIRING • LAMPS AND LIGHTING • COMMUNICATION • SIGNALING • VENTILATION • CONTROL • POWER APPARATUS • TOOLS

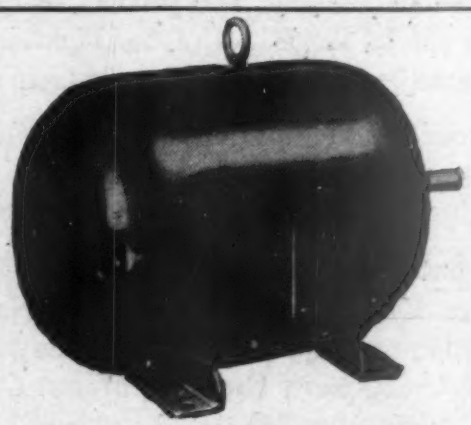
nanaing 1,019,882 lbs. of



Quiet, Smooth Performance
that's what WAGNER *Quality* MOTORS
give your Machine Tools

Wagner Quality Motors make a close machining job as easy as eating apple pie. They run "smooth as silk" and give performance that enhances the value of the machine tools they are driving.

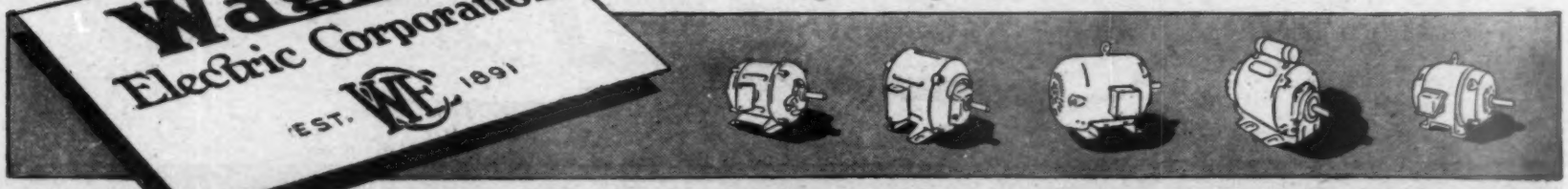
Because of smooth performance you find hundreds of thousands of Wagner Quality Motors on the job driving all types of industrial machines and equipment . . . That's why so many manufacturers have standardized on Wagner Motors. If you manufacture or use motor driven equipment Wagner can furnish the "RIGHT" Motor for your purpose. Users of Wagner motors also profit by our quick, convenient, nation-wide service facilities. Twenty-nine branch offices, located in principal cities, are ready to give you service and advice. Contact our nearest office, or write Wagner Electric Corporation, 6412 Plymouth Ave., St. Louis 14, Mo., for bulletins on the complete line.



The Wagner line of polyphase and single phase motors is diversified to meet all machine tool requirements. Open-type and totally-enclosed non-ventilated motors are available with sleeve or ball bearings; totally-enclosed fan-cooled motors are built with ball bearings only.

Wagner Electric Corporation
EST. WE 1891

Consult Wagner Engineers on all Electric Motor Problems

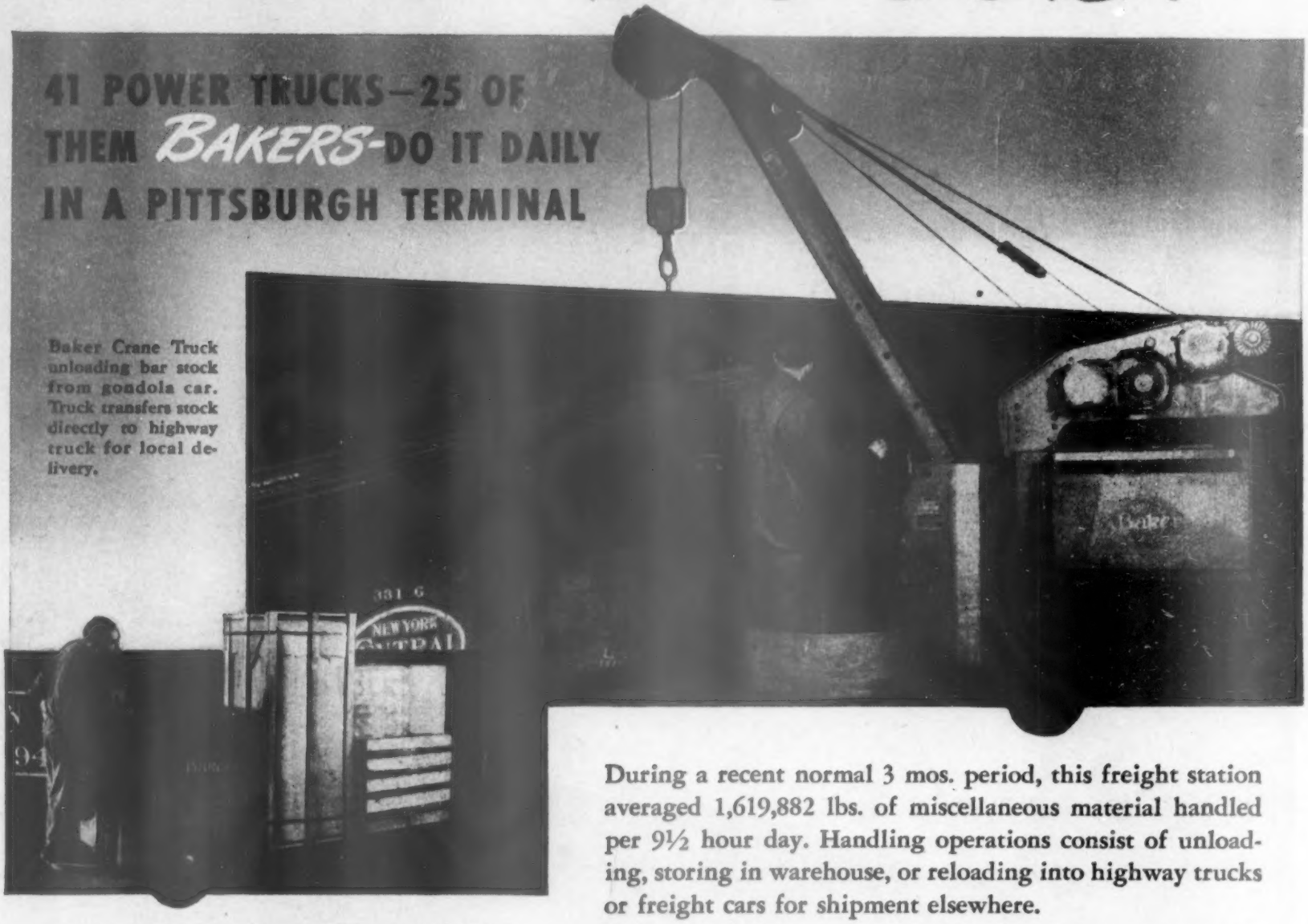


M47-19

• ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE PRODUCTS •

Handling 1,619,882 lbs. of freight is a BIG JOB!

41 POWER TRUCKS—25 OF THEM *BAKERS*—DO IT DAILY IN A PITTSBURGH TERMINAL



Baker Crane Truck unloading bar stock from gondola car. Truck transfers stock directly to highway truck for local delivery.

Cartons, crates or boxed materials arriving in box cars are unloaded with Baker Platform Trucks and stored or loaded into other vehicles.

This Baker Platform Truck is taking a load of freight into boxcar for shipment to another station.

During a recent normal 3 mos. period, this freight station averaged 1,619,882 lbs. of miscellaneous material handled per 9½ hour day. Handling operations consist of unloading, storing in warehouse, or reloading into highway trucks or freight cars for shipment elsewhere.

It's not only the tonnage that makes this job tough—but the many different sizes and shapes, degrees of fragility and varying points of destination typical of LCL freight handling.

To help accomplish this tremendous task at low cost the terminal uses 41 battery power trucks—with 21 Baker Platform Trucks and 4 Baker Crane Trucks carrying the major part of the load. The company is eminently satisfied with their efficient performance and reports that even though batteries are charged only once daily, there is *sufficient power to run the trucks the full 9½ hours without slowing down.*

If your problem is handling large quantities of miscellaneous material, Baker Trucks can help you solve it.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2178 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

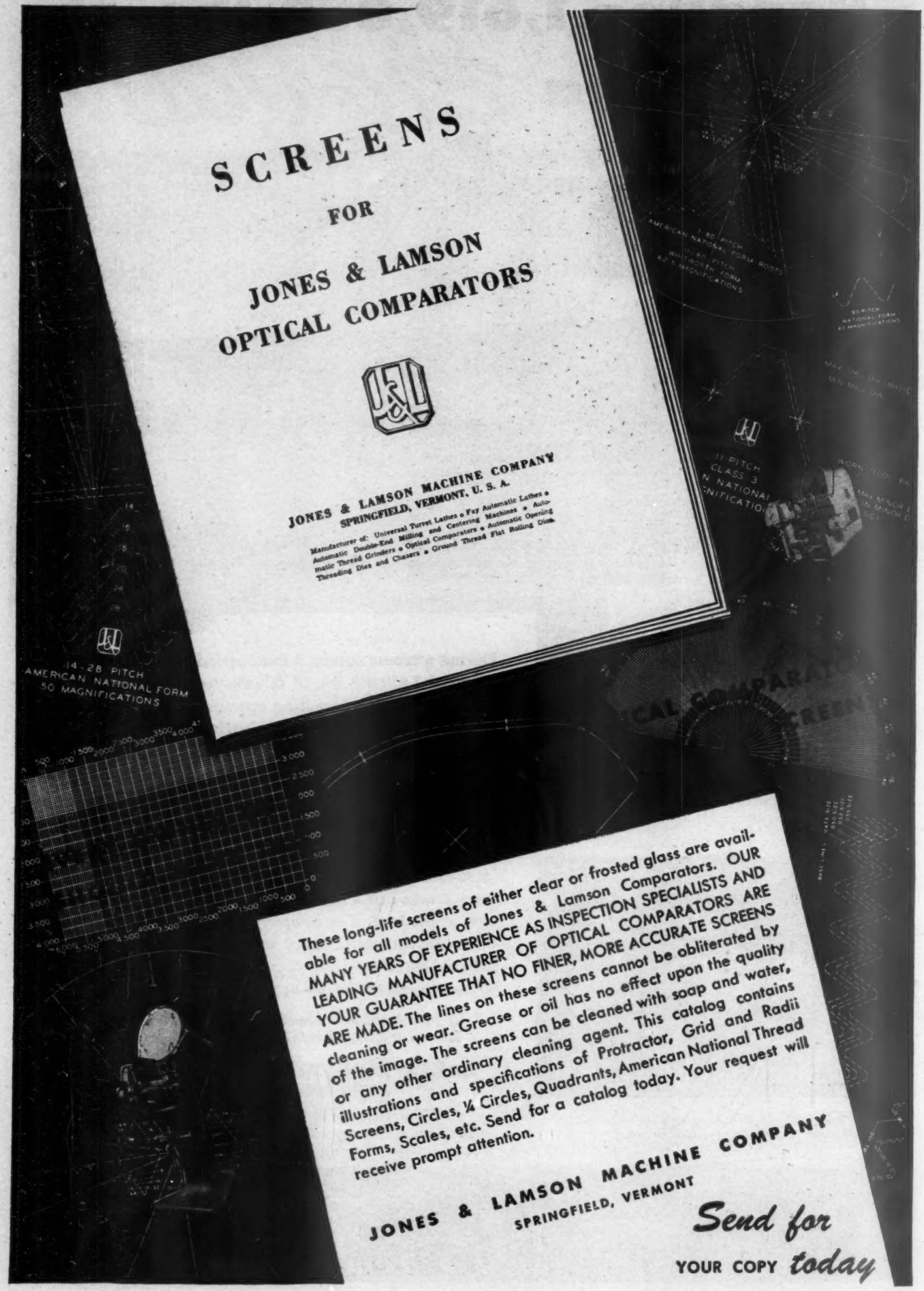
SCREENS

FOR

JONES & LAMSON OPTICAL COMPARATORS

JONES & LAMSON MACHINE COMPANY
SPRINGFIELD, VERMONT, U. S. A.

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies



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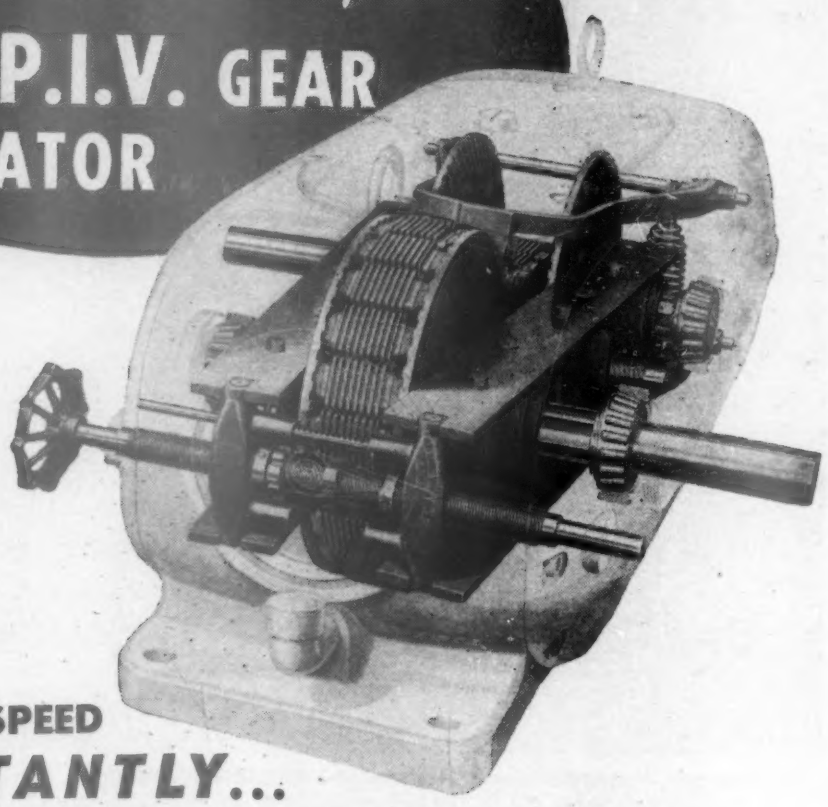
JONES & LAMSON MACHINE COMPANY
SPRINGFIELD, VERMONT

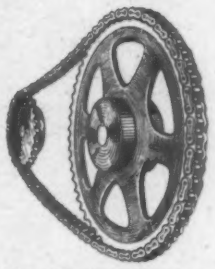
Send for
YOUR COPY *today*

MODERNIZE DRIVES *for Exact Speed* WITH LINK-BELT P.I.V. GEAR SPEED VARIATOR

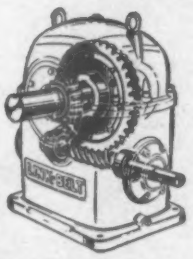


LINK-BELT POWER TRANSMISSION MACHINERY SERVES ALL INDUSTRY

SILVERSTREAK SILENT CHAIN DRIVES

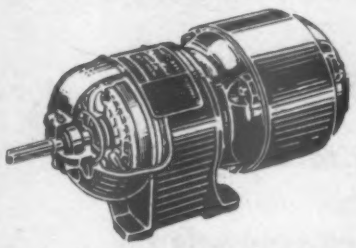


SILVERLINK ROLLER CHAIN DRIVES

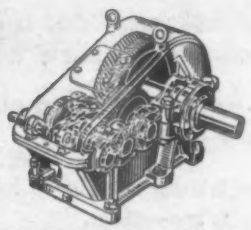


WORM GEAR SPEED REDUCERS

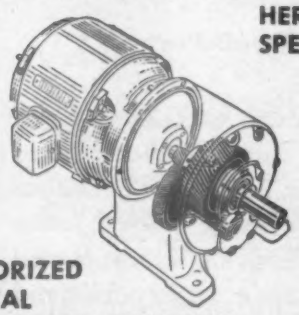
V-BELT DRIVES



ELECTROFLUID DRIVES

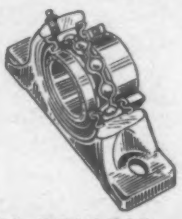


HERRINGBONE GEAR SPEED REDUCERS



MOTORIZED HELICAL GEAR SPEED REDUCERS

UNMOUNTED BALL AND ROLLER BEARING UNITS



BALL BEARING MOUNTED UNITS

ROLLER BEARING MOUNTED UNITS

BABBITTED BEARINGS

GET ANY SPEED *INSTANTLY...*

MAINTAIN IT ACCURATELY *with this* POSITIVE, INFINITELY VARIABLE *Speed Changing Unit*

In any process where precise speed is a factor in quality, costs, efficiency or profits, the P. I. V. Gear speed variator supplies the ideal drive. With this unit, power is transmitted through an all-metal chain, making tooth-to-tooth contact with metal wheels. Within wide limits this unique, self-contained unit enables you to vary the speed of a driven machine to a minute fraction of a revolution per minute. Once selected, the chosen speed is maintained indefinitely, without slip or creep. Speed is changed while the drive is running by a small hand wheel, or by automatic or remote control.

Built for vertical or horizontal mounting, plain or motorized, and with or without enclosed reduction gears. From ½ to 15 h.p. and ratios up to 6:1. Get book 1874 for full details.

LINK-BELT COMPANY

THE LEADING MANUFACTURER OF CONVEYING AND MECHANICAL POWER TRANSMISSION MACHINERY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities. 10,737-B

THE SYMBOL OF QUALITY · LINK-BELT · LB

LINK-BELT

Power Transmission Machinery

Carrying racks of concrete blocks; loads range from 3600 to 6000 lbs.

Real Results obtained with ELWELL-PARKER Trucks:

Trucks handle 275 racks in 9½ hours.

One truck has been operated round-the-clock for 6 months, stopping only for battery changes and greasing.

★ "Operating costs 25% less than with any other motive power."

★ "In one full year, not a minute lost due to mechanical failure."

★ "Truck enables four men to be shifted to other jobs."

★ "Trucks have made a high production schedule possible."

★ "Our next truck will be an Elwell-Parker."

These are a few highlights from the success story of Elwell-Parker trucks at a Eastern concrete block plant (name upon request) . . . In over 300 *other* branches of industry, *bigger* unit loads are being moved *faster* and for *less* using Elwell-Parker Trucks, Tractors and Cranes . . . *You, too, can benefit*—have an experienced *E-P* man "tailor" this equipment to fit your specific plant facilities and production methods. The Elwell-Parker Electric Company, 4323 St. Clair Avenue, Cleveland 14, Ohio.

"INDUSTRIAL LOGISTICS"
Send for this complete handbook on the science of materials handling.

ELWELL-PARKER

Established 1893

POWER INDUSTRIAL TRUCKS

GT-Specified

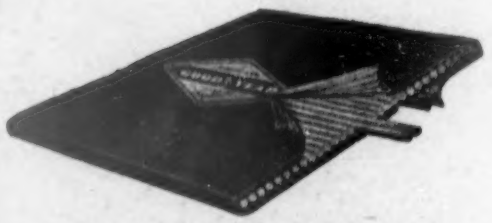
GOODYEAR INDUSTRIAL RUBBER PRODUCTS

THE BIG 3 FOR BIG SAVINGS

HERE are three standout performers that have proved their worth in countless installations. They exemplify the economy, the long life, the tried-and-true dependability you get from all Goodyear Industrial Rubber Products.

Whatever your rubber problem, you'll find the answer in a Goodyear product, specified in the size and construction best suited to your needs by the G.T.M. — Goodyear Technical Man. For on-the-spot advice by this friendly counselor, write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

YOU'LL SET NEW PERFORMANCE STANDARDS WITH THESE OLD RELIABLES



ENDLESS COMPASS BELTS, for compressors, generators, fans, line shafts and other heavy-duty drives. In many installations they have outlived and outperformed ordinary belts three and four to one.

STYLE M STEAM HOSE for all steam service up to 100 pounds' pressure. Tough, flexible construction with tube specially compounded to hold saturated steam. Tough cover to resist abrasion.

EMERALD CORD AIR HOSE — a truly "super" air carrier. Lighter than ordinary hose, yet far tougher, stronger, longer-lasting, thanks to new construction. Oil-resistant tube. Best buy for heavy-duty service.

FOR HOSE, BELTING, MOLDED GOODS, PACKING, TANK LINING, built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

Compass, Emerald Cord—T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR

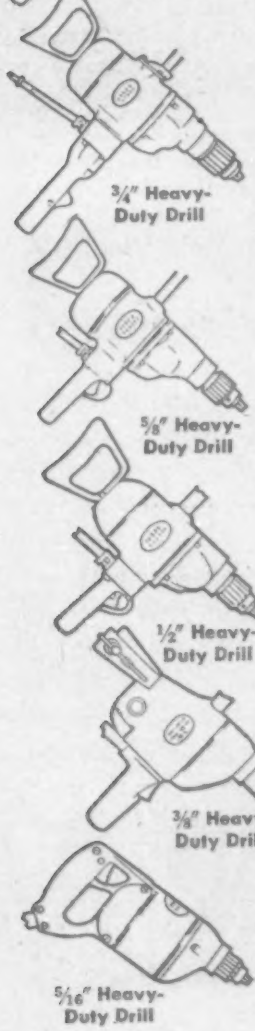
THE GREATEST NAME IN RUBBER

Stamina for Production Drilling . . .

1/4" Heavy-Duty Drill

Torque for Heavy . . . Drilling and Reaming

1 1/4" Heavy-Duty Drill



1" Heavy-Duty Drill

3/4" Heavy-Duty Drill

5/8" Heavy-Duty Drill

1/2" Heavy-Duty Drill

3/8" Heavy-Duty Drill

5/16" Heavy-Duty Drill

You Get BOTH from Van Dorn Heavy-Duty Drills!

Whether you're running drills hour after hour in production . . . or driving them through big girders and heavy timbers . . . you step up your output when you tool up with the Van Dorn *Heavy-Duty* Drill Line! Just consider these *facts:*

These Drills are *specifically* built for the toughest kind of use. They are powered by heavy-duty Van Dorn motors. They are equipped with heavy-duty gears and ball bearings throughout. And the larger models have roller bearings on their chuck spindles to transmit torque and withstand severe thrust.

You have eight Van Dorn *Heavy-Duty* Drills from which to choose, in capacities from 1/4" to 1 1/4" to fit your specific needs. Ask your nearby Van Dorn Distributor for full details on these powerful Drills today. Write for your free copy of our catalog to: The Van Dorn Electric Tool Co., 719 Joppa Road, Towson 4, Maryland.

FOR POWER SPECIFY

"Van Dorn"

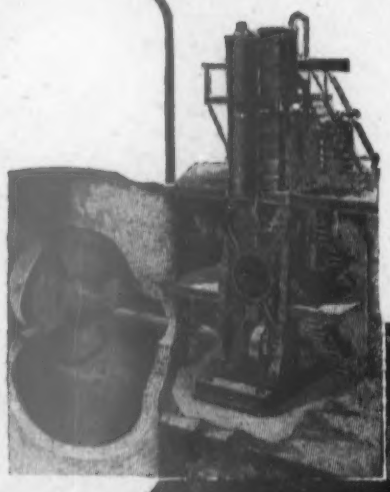
(DIV. OF BLACK & DECKER MFG. CO.)

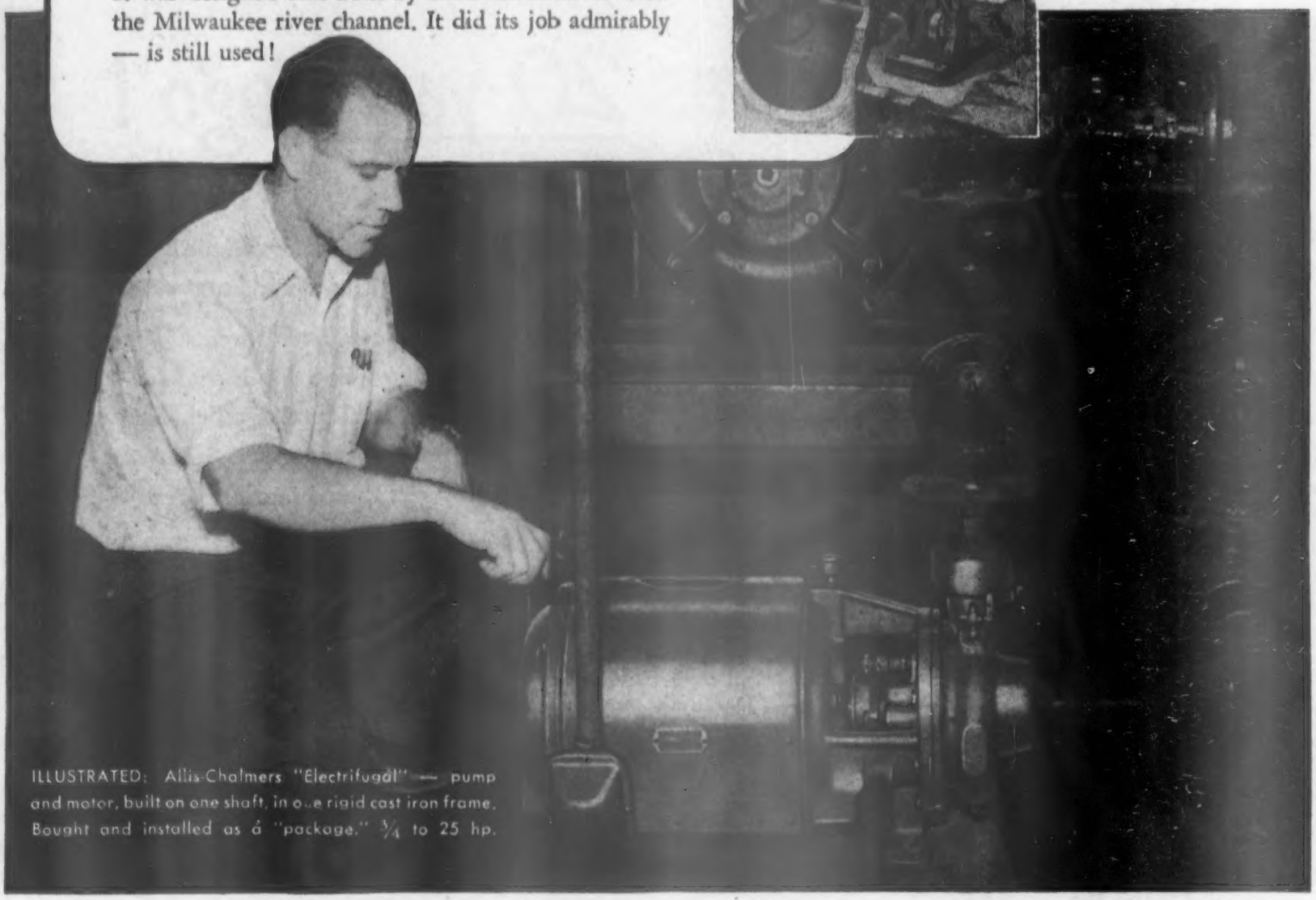
PORTABLE ELECTRIC TOOLS

IN 1888:

This pump made a river run faster . . .

It was designed and built by Allis-Chalmers to flush the Milwaukee river channel. It did its job admirably — is still used!





ILLUSTRATED: Allis-Chalmers "Electrifugal" — pump and motor, built on one shaft, in one rigid cast iron frame. Bought and installed as a "package." ¾ to 25 hp.

TODAY: Allis-Chalmers pumps move nearly all liquids with unusual economy!

WHETHER YOU need a pump to move a river of water — or liquids high in solid content — or to develop tremendous pressures — or need just a small, compact and highly economical pump like the "Electrifugal" unit illustrated above . . . Allis-Chalmers probably makes what you want.

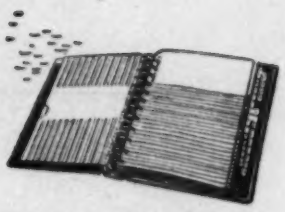
To fit your needs, trained A-C representatives select exactly the *right* pump and motor combination from a truly *complete* range of equipment. No need to recommend an approximation—undivided responsibility for the efficient performance of both pump and motor.

For more detailed information call your nearest A-C office or dealer, or write for Bulletin 6059-C. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2211

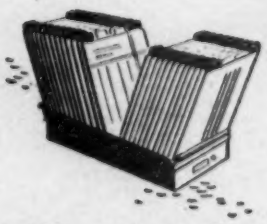
Centrifugal Pumps by ALLIS CHALMERS

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

1940 was 20 years ago !

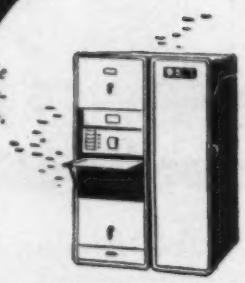


FLEX-SITE... *Visible Binders offer large visible margins for wide range of record sizes.*



V-LINE... *Posting trays provide automatic working "V" throughout. Eliminate compressors... keep ledgers in order . . . stuff easily.*

TRA-DEX... *Vertical Visible Files with 3-way visible margins give facts at a glance.*



FLOFILM... *A self-contained micro-film process. Micro-film can be finished one hour after exposure.*

In office methods, we mean. Busy war plants just couldn't be bothered with the happy-go-lucky systems of pre-war days, when skilled office help was abundant and costs were low.

So methods advanced twenty years almost overnight—card records were put on wheels . . . locked-in ledger sheets were slipped into V-line slots instead . . . dog-eared inactive records were filed in sleek steel containers stacked ceiling-high . . . permanent records were microfilmed and valuable storage space released. All over the office, even out in the plant, record keeping was shifted into high gear!

Today's problems of personnel, of floor space, and of prolific record-keeping are no less acute than those of the busy war years just passed.
Peacetime industry cannot return to a pre-war office overhead schedule.

With so many Diebold modern aids to office efficiency available right now, there is no longer a need to battle growing office overhead costs with outmoded weapons.

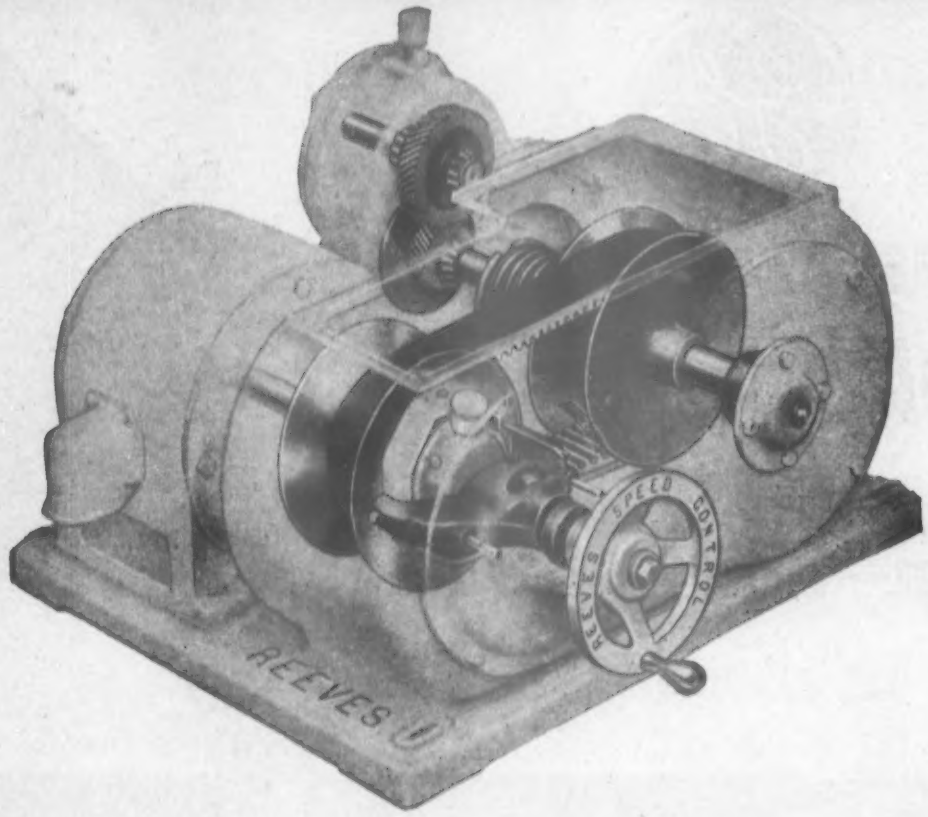
Your Diebold Man can quickly bring you important news about fitting the right equipment to the job—rotary, vertical, visible files or microfilm—can show you ways and means to meet your current office problems.

There are Diebold Branches or dealers in all principal cities.

Diebold
INCORPORATED
Canton 2, Ohio

MICROFILM • ROTARY, VERTICAL AND VISIBLE FILING EQUIPMENT • SAFES, CHESTS AND VAULT DOORS • BANK VAULT EQUIPMENT • BURGLAR ALARMS • HOLLOW METAL DOORS AND TRIM

CARDINEER... *Rotary Card File speeds reference and posting . . . maintains control at minimum cost.*



260,000 Testimonials Tell the REEVES Story

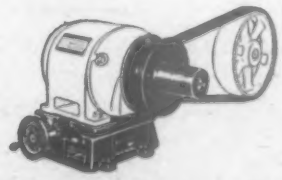
These testimonials aren't letters—but machines! They are doing the intricate jobs, the strange jobs and the familiar jobs on production lines in scores of industries, your own included. They are handling materials of widely varying consistency, weight, hardness and temperature . . . steel, textiles, rubber, foods, plastics, glass, pharmaceuticals and many others. They are stamping, grinding, shaping, turning, winding, spreading, cooling, buffing, conveying and so on . . . some under the direction of skilled, experienced operators and others in the hands of awkward newcomers. But this they have in common: *all* 260,000 of these machines are equipped with REEVES Speed Control . . . *all* are performing each and every operation at exactly the right speed to get the best from man, material and machine . . . *all* are proving, through their day-after-day performance, that REEVES holds the key to improved production—cost-wise and quality-wise!

REEVES PULLEY COMPANY · COLUMBUS, INDIANA

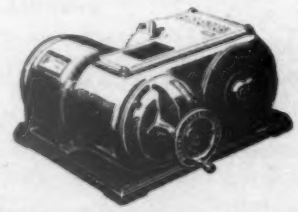
Recognized Leader in the Specialized Field of Speed Control Engineering

THE THREE BASIC REEVES SPEED CONTROL UNITS

VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.



VARI-SPEED MOTOR PULLEY converts any standard constant speed motor to a variable speed drive within 4:1 ratio. Sizes to 15 hp.



MOTODRIVE combines motor, speed varying mechanism and reduction gears in single compact unit. Speed variations 2:1 to 6:1 inclusive. Sizes to 15 hp.

Accurate Variable

REEVES Speed Control

Gives the Right Speed for Every Job!

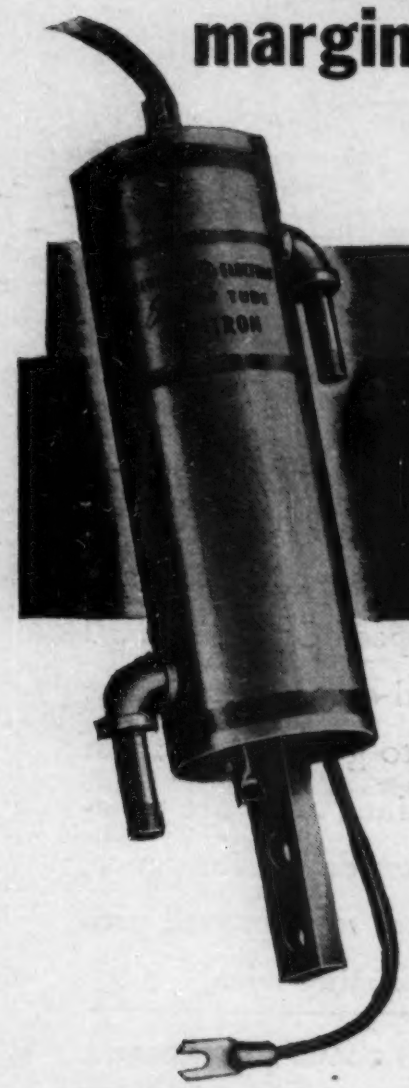
GENERAL ELECTRIC

SAME-DAY TUBE SERVICE

helps you protect this margin—vital to profits!

SELLING PRICE

PRODUCTION COST



GL-5551/FG-271 IGNITRON

Widely used G-E steel-jacketed tube for welder-control work. Opens and closes the main welding circuit. One of many important electronic-tube links in your high-speed production chain . . . Ratings are: max kva demand 600 with avg anode current 30.2 amp—max avg anode current 56 amp with kva demand 200.

IT'S a man-size job, holding your production costs at a level where they won't menace distribution expense and a fair return to stockholders. Every hour of every machine's operation must "pay off" in goods finished or assembled.

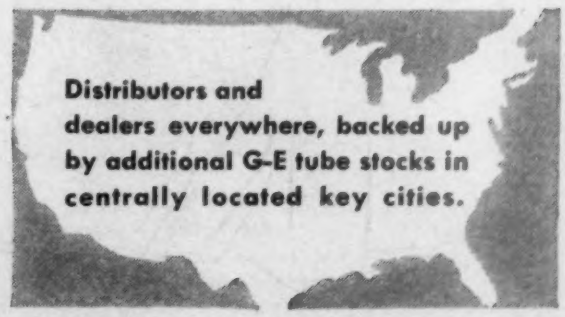
Idle machine time is waste, sending the cost of manufacture skyrocketing. Much of your plant equipment uses electronic tubes for control, power-rectification, or other purposes. The tubes are dependable, long-serving . . . but now and then one must be replaced.

How long to get a new tube? The answer may mark the difference between days of costly shutdown time, and continuing profitable production.

Phone your nearby G-E tube distributor or dealer, and you'll get fast *local* delivery from *local* stocks! A new, operable tube with the right ratings will be plugged in and your idle machine start humming again, in hours—or less.

Or, better yet, gain the whiphand over shutdowns from occasional tube failure by communicating *today* with your local G-E tube supply source! Have his representative check your tube needs and suggest a minimum-cost emergency inventory for you.

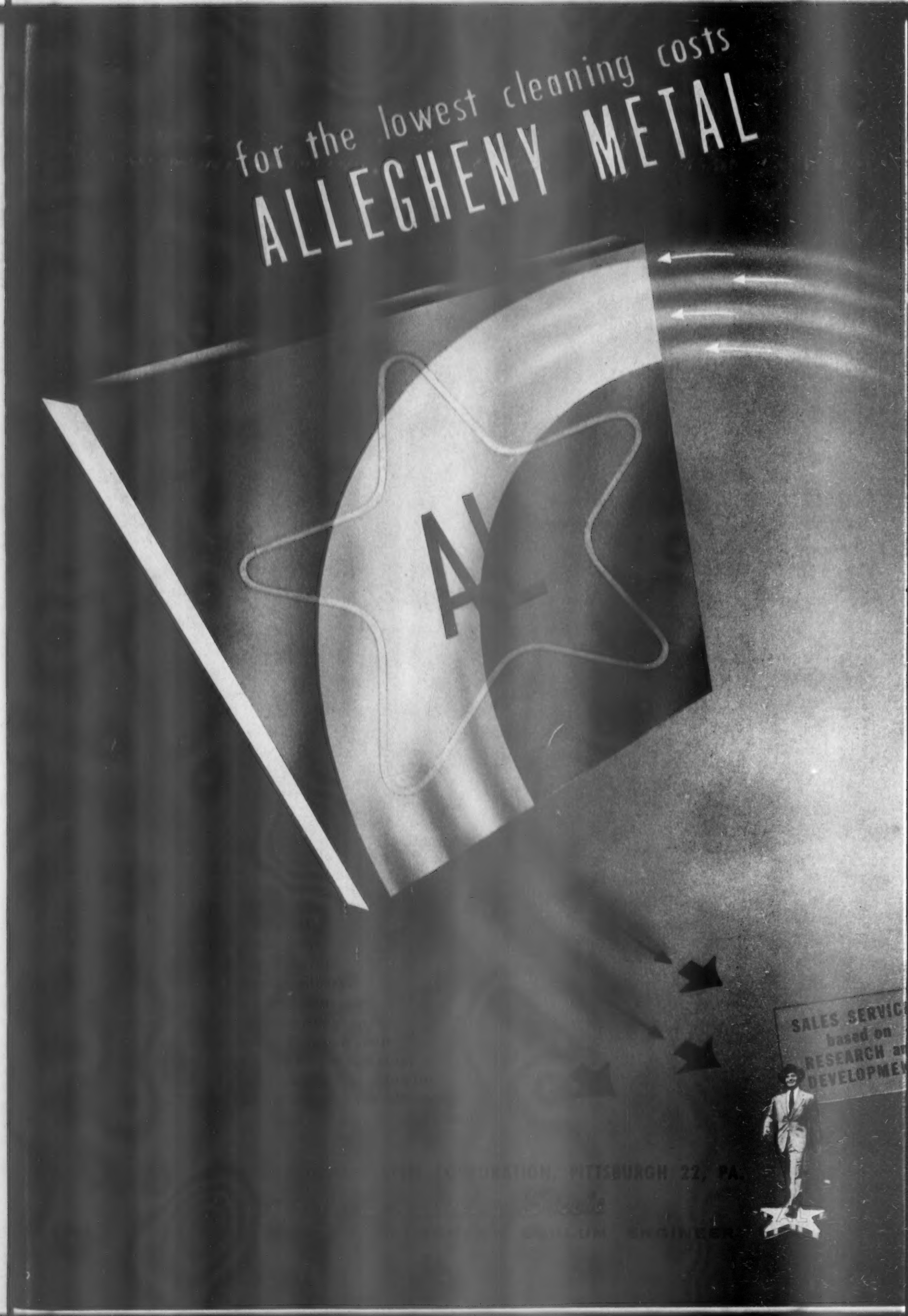
Also inquire about General Electric's ironclad performance warranty—a plus-value that clinches the worth of G-E SAME-DAY TUBE SERVICE. *Electronics Department, General Electric Company, Schenectady 5, New York.*



GENERAL ELECTRIC

162-FG-6850

FIRST AND GREATEST NAME IN ELECTRONICS

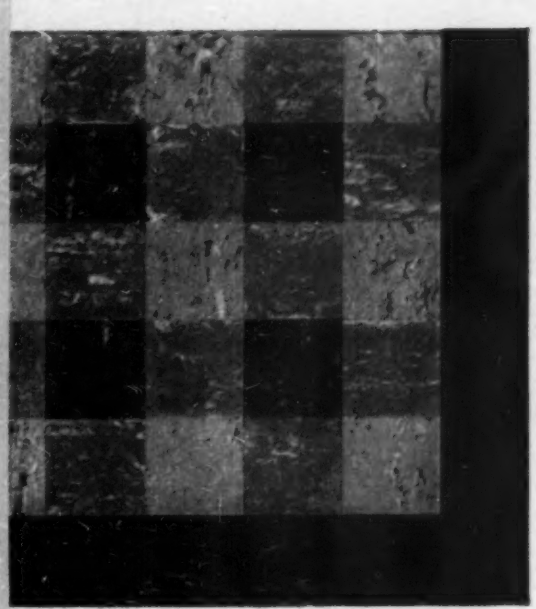

for the lowest cleaning costs
ALLEGHENY METAL
SALES SERVIC
based on
RESEARCH an
DEVELOPME

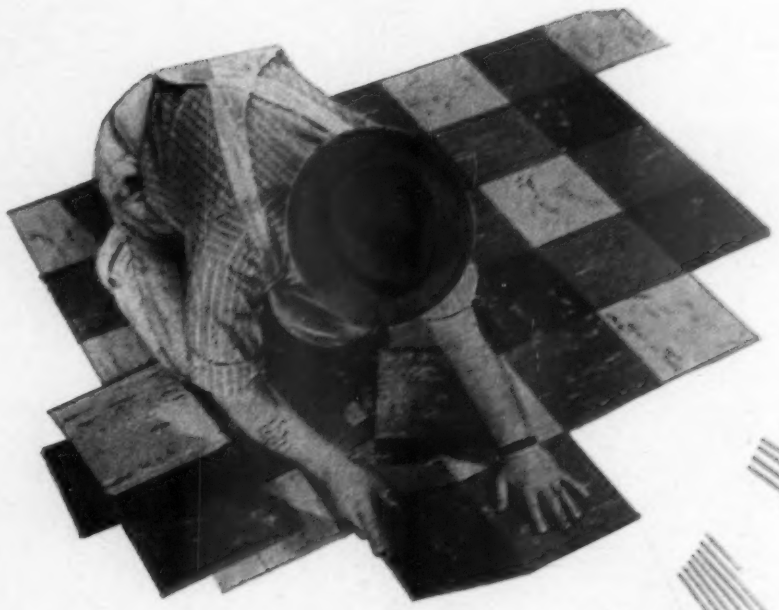
For Offices

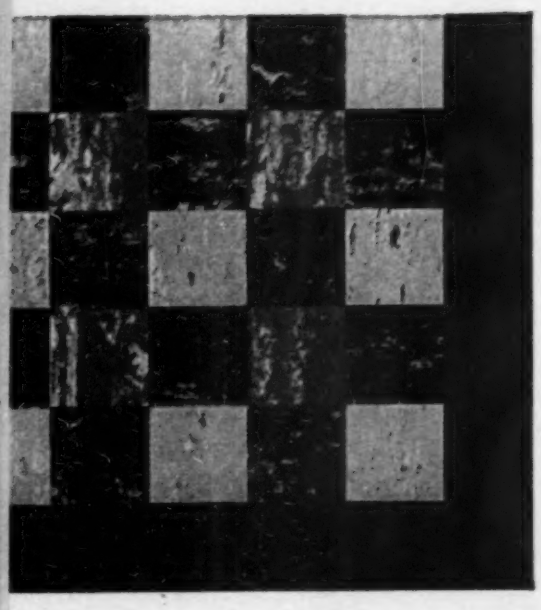
. . for University Lecture Rooms

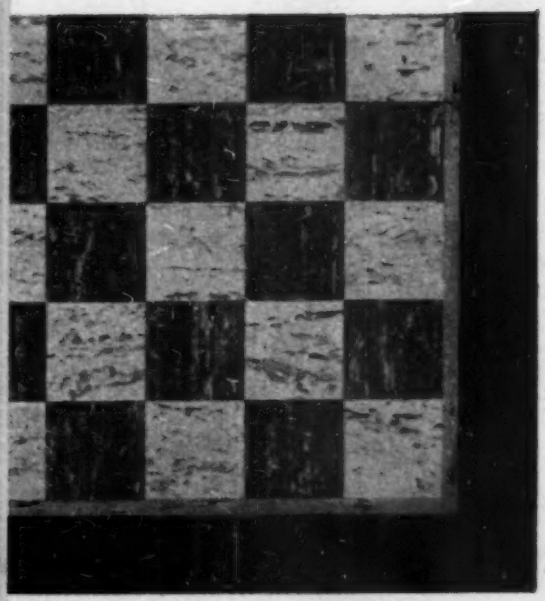
. . . for Laboratories

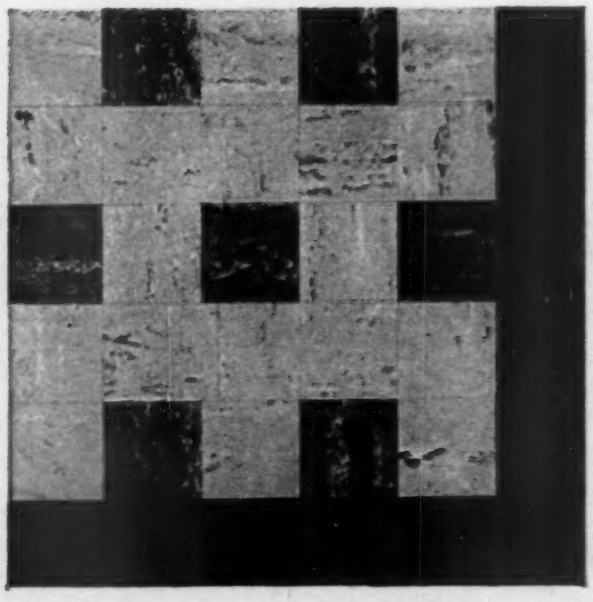
Colorful floors . . .

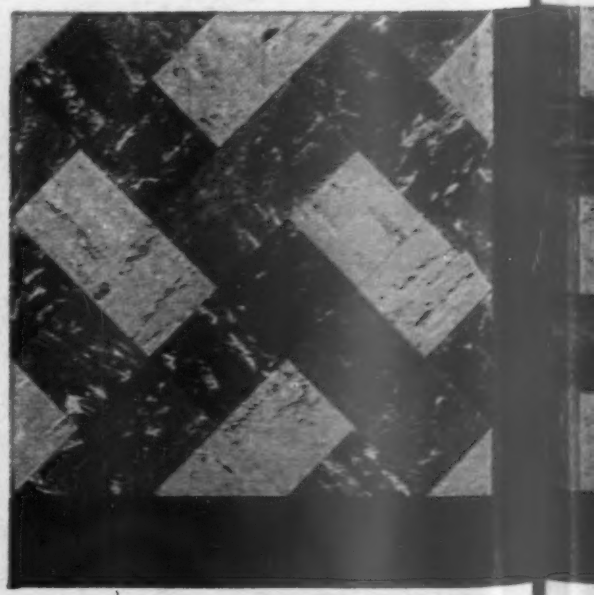


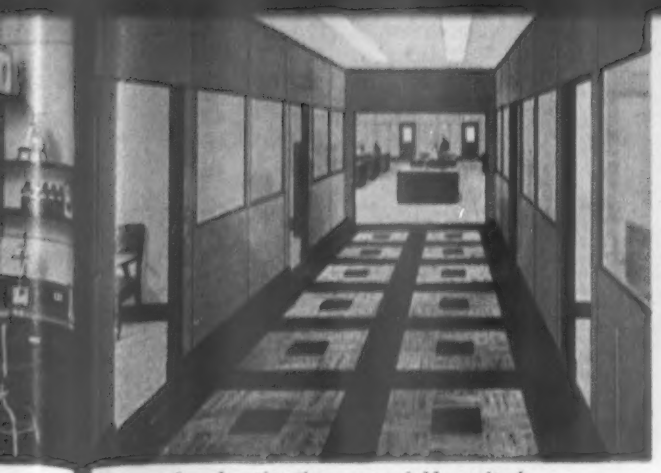












. . . for Institutions and Hospitals

. . . for Schools

. . . for Factory Areas

. . . longer-wearing, low in cost!

Picture what a marvelous difference Johns-Manville Asphalt Tile can make on *your* floor. Here's a resilient, attractively modern flooring with an iron constitution.

• Nowadays, it costs you no more to have *quality* floors like these—with cheerful colors, attractiveness, extra-long life.

That's the kind of flooring you get with Johns-Manville Asphalt Tile. It's easy on the eyes, easy on the feet, and easy on the budget, too.

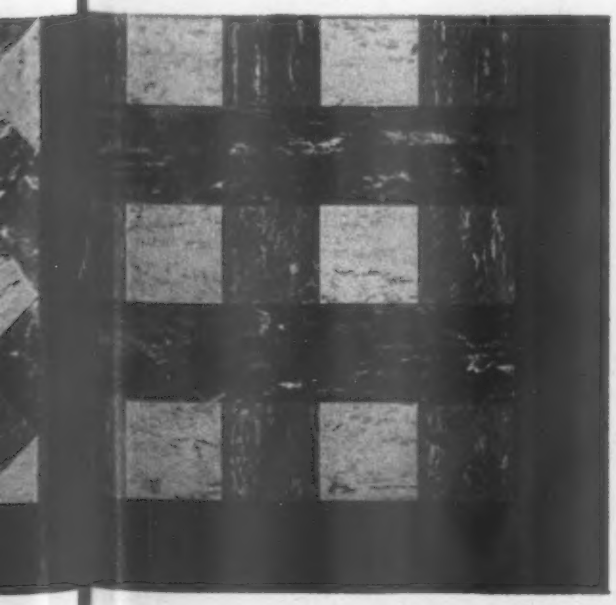
Yes, you'll like *everything* that this flooring means in looks, in cost, in upkeep. And you'll like the unlimited range of color combinations—from striking patterns with strong contrasts to solid fields of marbleized colors.

Also, you'll find advantages in the easy way units can be arranged in functional designs—such as traffic directing lines, or islands of color to set off activities in special areas. What's more, the individual units permit easy alterations or extension of patterns. Reinforced with fibers of indestructible asbestos, J-M Asphalt Tile resists scuffing under the *heaviest* foot traffic. Does not originate dust. Stays fresh and unmarred with practically no maintenance. Even a carelessly dropped cigarette won't harm its built-in beauty.

For areas exposed to oil or grease, use J-M *Greaseproof* Asphalt Tile. Send for our full-color brochure, "Ideas for Decorative Floors." Johns-Manville, Box 290, New York 16, N. Y.

Because of unprecedented demands, supply continues to be short despite greatly increased output. So please anticipate your requirements as far in advance as possible.

Johns-Manville *Asphalt Tile* Flooring



Johns-Manville Asphalt Tile Floors can be combined with J-M Walls and Ceilings for UNIT CONSTRUCTION

J-M Movable Transite Walls

Using these Johns-Manville products together in a system of Unit Construction, you can provide your interiors with such important advantages as *structural flexibility* to meet changing needs . . . greater architectural beauty . . . increased comfort.

J-M Unit Construction combines resilient Asphalt Tile Floors, demountable Acoustical Ceilings, and movable Transite Walls—in other words, the *complete interior*, under *one* specification, *one* manufacturer's responsibility.

Get the full details on this development. Write for colorful brochure, "J-M Unit Construction."

J-M Acoustical Materials

TO SAVE SPACE...

Specify V-Belts

FOR MORE H.P....

Specify Steelply Reinforced

Where limited space makes it necessary to cut the center-to-center distance between motor and driven pulley, it's a job for positive power transmission—for V-belts.

And with Roebling Steelply cord reinforcing, you can buy V-belts of far greater strength... up to 40% more horsepower per inch of belt width! This can often permit the use of smaller and fewer belts... and frequently you don't even need outboard bearings on drives. The result is far more compact, troublefree installations.

What's more, belt slippage is radically reduced... Steelply reinforced belts *remain* matched. For their stretch is practically zero—even under peak loads and overloads. And since their speed range is unlimited, you can operate them even at lowest, most economical speeds.

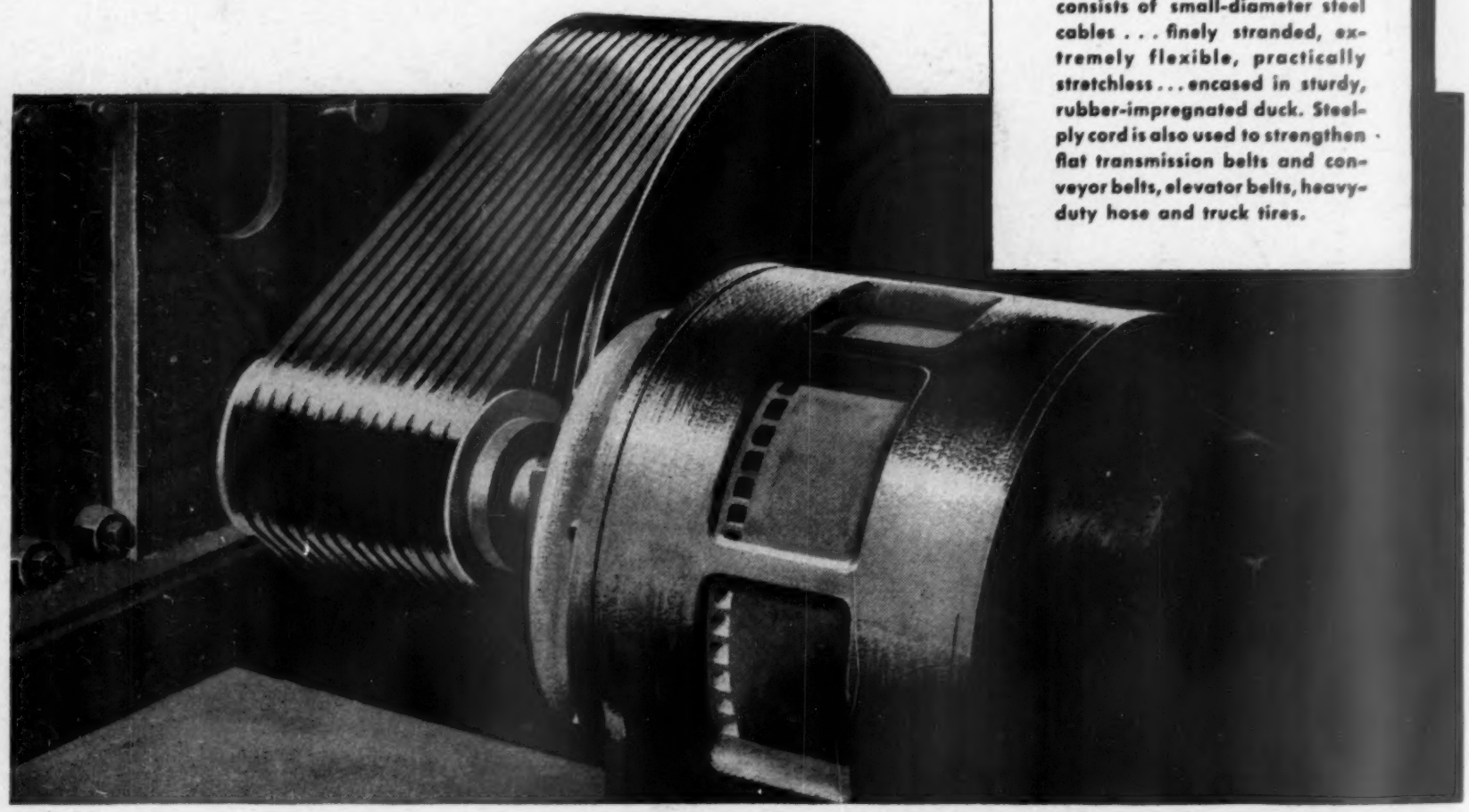
Ask your belt supplier what V-belts reinforced with Roebling Steelply cord can mean to you—in greater efficiency, reduced costs.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

WHAT IS STEELPLY?

Roebling Steelply cord is the load-carrying core in a revolutionary new kind of V-belt. It consists of small-diameter steel cables . . . finely stranded, extremely flexible, practically stretchless... encased in sturdy, rubber-impregnated duck. Steelply cord is also used to strengthen flat transmission belts and conveyor belts, elevator belts, heavy-duty hose and truck tires.

Adds the Strength of Steel to the Resilience of Rubber



ROEBLING

A CENTURY OF CONFIDENCE

This is all there is to the "Feather-Touch" Clutch Control—simple, positive, dependable.

This is ALL you need

4 to 44 tons

for easy operation

A simple drum and band device—free from high-pressure lines and pumps—nothing to refill—unaffected by weather or temperature—simple, positive, dependable and proved in years of service—that's the Northwest "Feather-Toutch" Clutch Control.

The clutch action is in direct ratio to the movement of the operating lever, the feel of the load is always present, release is positive and there can be no shutdown because of control failure.

Easy operation is one of the secrets of high output. It means less fatigue, greater safety and better control of the load that pays out in stacking, spotting to trucks or cars and in handling materials to overhead loading decks or doors. This feature alone will cut your costs by increasing output.

It is one of the many Northwest features that make Northwest a better yard crane. Plan ahead to have it and cut your yards costs. Let us send you details.

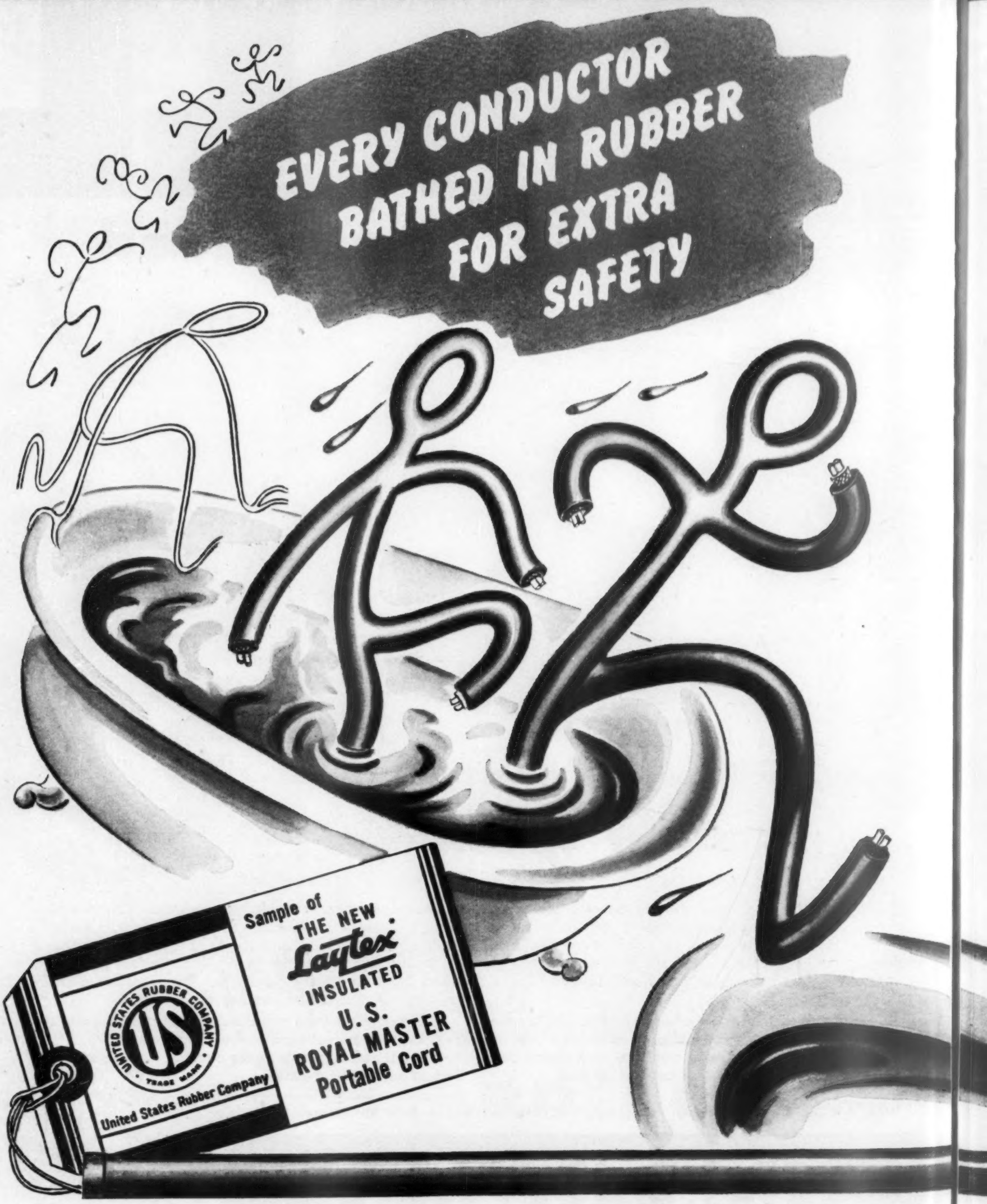
NORTHWEST ENGINEERING CO., 1512 Field Bldg., 135 So. La Salle St., Chicago 6, Ill.

Does things no other type of material handling equipment can do!

NORTHWEST

The Crane that goes Anywhere!

UNITED STATES RUBBER COMPANY



SERVING THROUGH SCIENCE

The New U.S. ROYAL MASTER CORDS

WITH *EXCLUSIVE,* POSITIVE PROTECTION OF Laytex* INSULATION

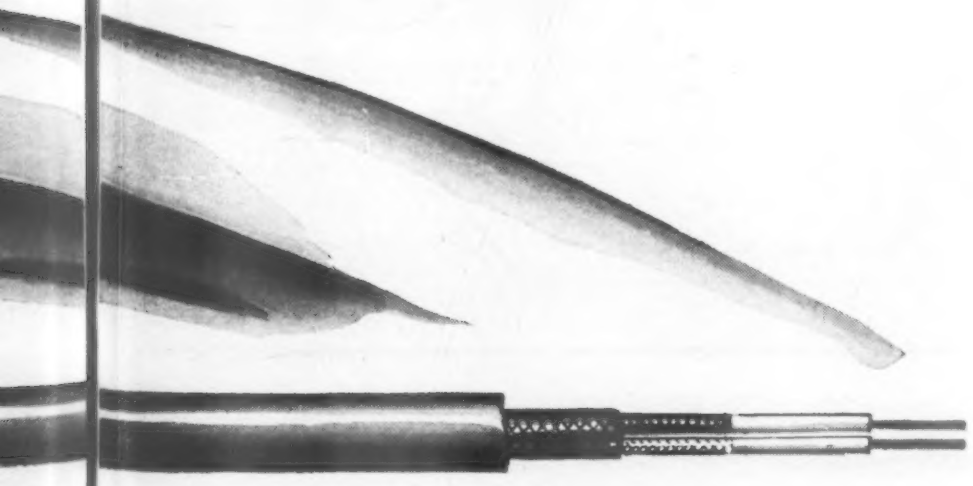
"U.S." presents an entirely new development in portable cords! Every conductor in the new U.S. Royal Master Cords is bathed in Laytex, 90% pure rubber insulation. This Laytex Insulation provides high physical strength and elongation, high dielectric strength and insulation resistance, excellent aging and moisture-resistant properties.

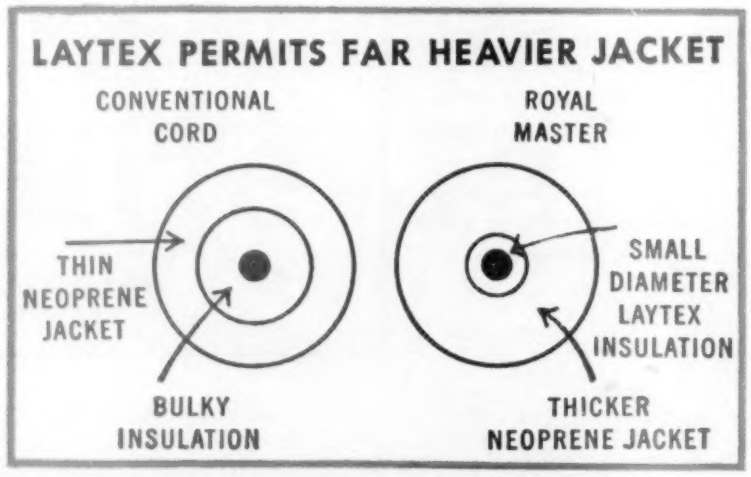
More important still, Laytex Insulation means fully insulated conductors of *smaller diameter,* thus permitting application of a Neoprene jacket far heavier and denser than is usually found on the best cord on the market. This extra-thick Neoprene jacket is more abrasion-resistant, higher in tensile strength and in resistance to oil, water, fire and cold.

For extra rough industrial usage there is a Royal Master which has five stainless steel strands added to each conductor, giving over twice the bend and twist resistance and quintupling the impact resistance.

U.S. Royal Master Cords are ideal for use on such industrial equipment as: portable electrical machinery and tools, lamps, electric sanders and polishers, railroad equipment and many others. Write for complete information to United States Rubber Company, Wire and Cable Department, 1230 Avenue of the Americas, N. Y. 20, N. Y.

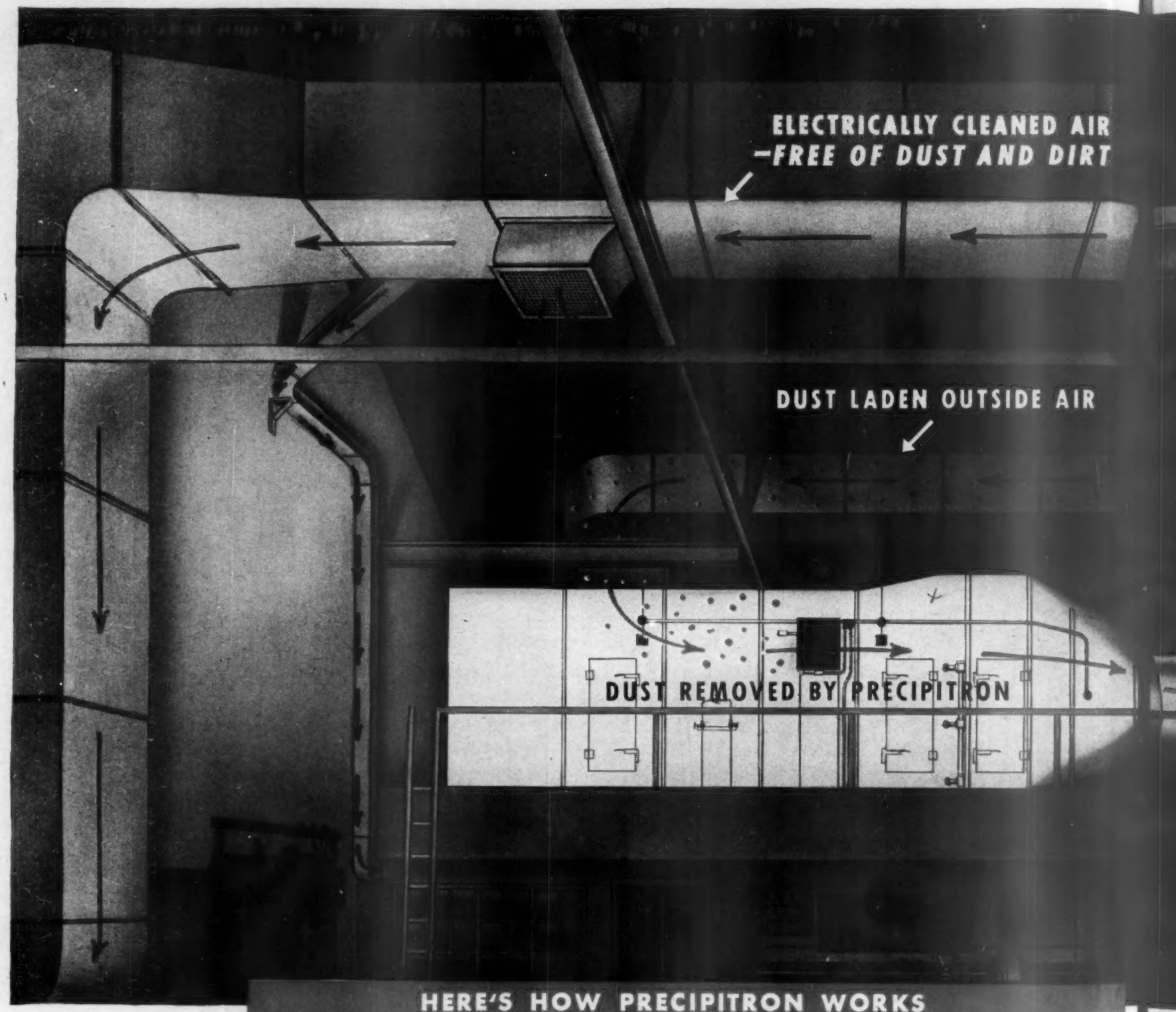
*Reg. U. S. Pat. Off.





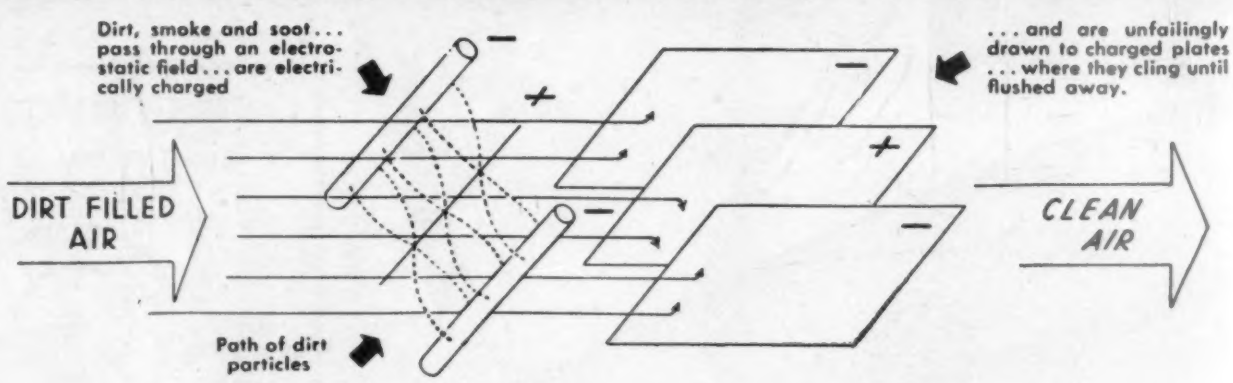
MAINTENANCE COSTS

HOW CLEAN AIR CUTS



Schematic diagram of Precipitron installed in Sturtevant air conditioning system—mounted on gallery above floor level of maintenance shop. Clean air is supplied to this shop, and to adjoining rotary converter and compressor rooms.

HERE'S HOW PRECIPITRON WORKS


Dirt, smoke and soot... pass through an electrostatic field... are electrically charged
... and are unfailingly drawn to charged plates ... where they cling until flushed away.
DIRT FILLED AIR
CLEAN AIR
Path of dirt particles

MAINTENANCE COSTS

PRECIPITRON CONTROLS OIL MIST, TOO!

In metal working plants, Precipitron Oil Mist Control Units collect and reclaim oil coolant mist from high speed machine tools—improve working conditions, eliminate fire hazard, and save as much as 2½ gallons of coolant oil per day on a single machine.

Westinghouse Precipitron* makes it cheaper to clean the air than to repair your plant equipment

IS factory dust and dirt a "necessary evil"—or does it actually cost more than the equipment which could get rid of it? Here's how a large Eastern machinery manufacturer answered that question—at a *substantial saving.*

In their power house, the cost of trying to keep equipment clean was a big item in the maintenance budget—so big that they decided something had to be done about it. Now, instead of cleaning the *equipment,* they clean the *air*—continually and automatically, with Precipitron, the electronic air cleaner!

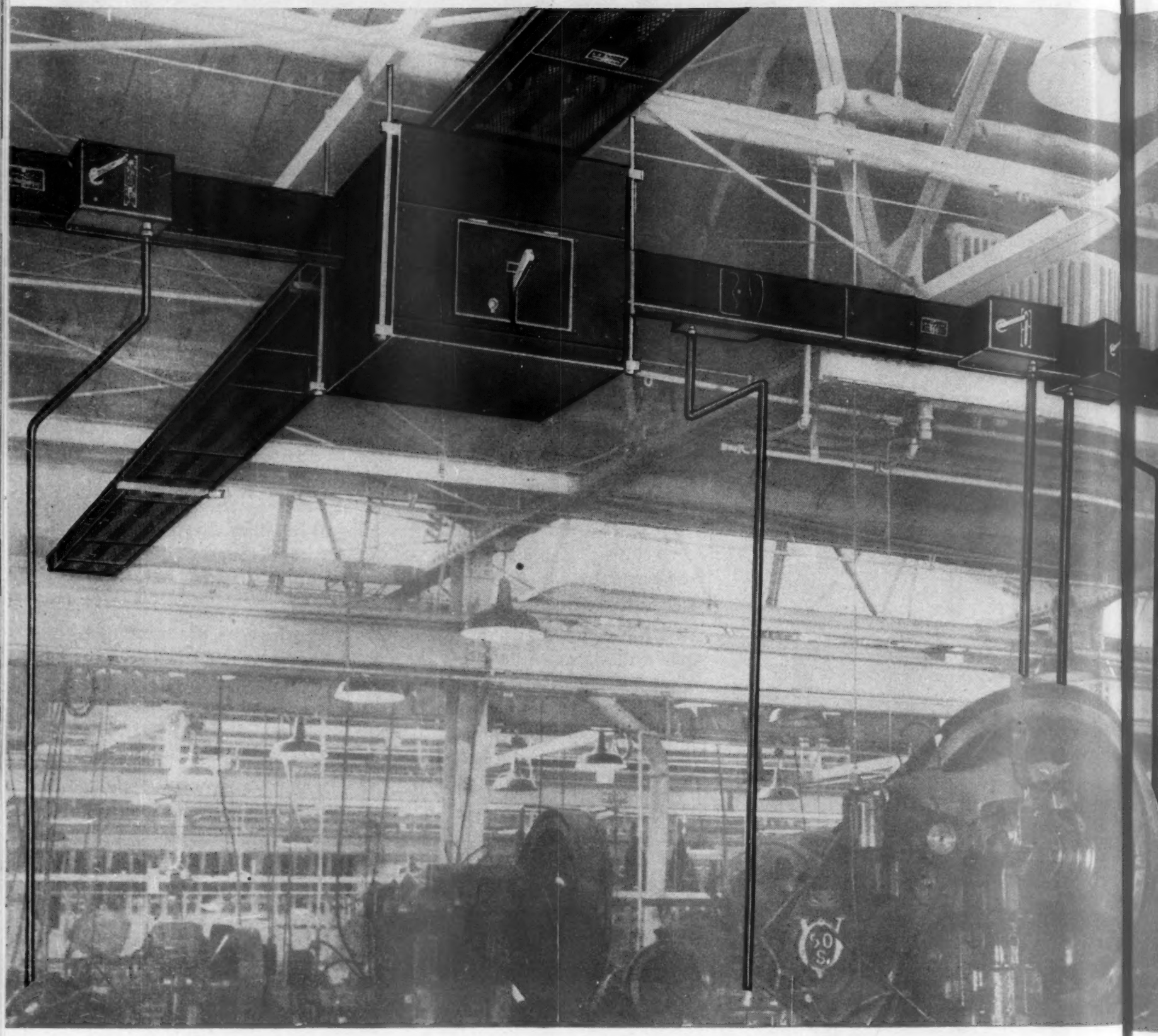
With Precipitron on the job—their rotary-converter room, compressor room and maintenance shop are supplied with air from which even the tiniest dust particles have been removed. Result: equipment lasts *longer* because it stays *cleaner*—machines run cooler, more efficiently, with greatly reduced abrasive wear on rotating parts. And Precipitron gives these advantages at a fraction of their former maintenance costs.

Today, in every branch of industry, skillfully engineered air offers limitless possibilities for finding new ways to improve production and cut costs. And Westinghouse is ready to help you and your contractors solve *your* plant problems by putting air to work, not only with complete equipment but also with ideas and assistance in planning. Write your nearest Westinghouse Office or Westinghouse Electric Corporation, *Sturtevant Division,* Hyde Park, Boston 36, Mass.

*Trademark Registered in U.S.A.

Westinghouse
Sturtevant
DIVISION

Save tomorrow's



BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

BULLDOG

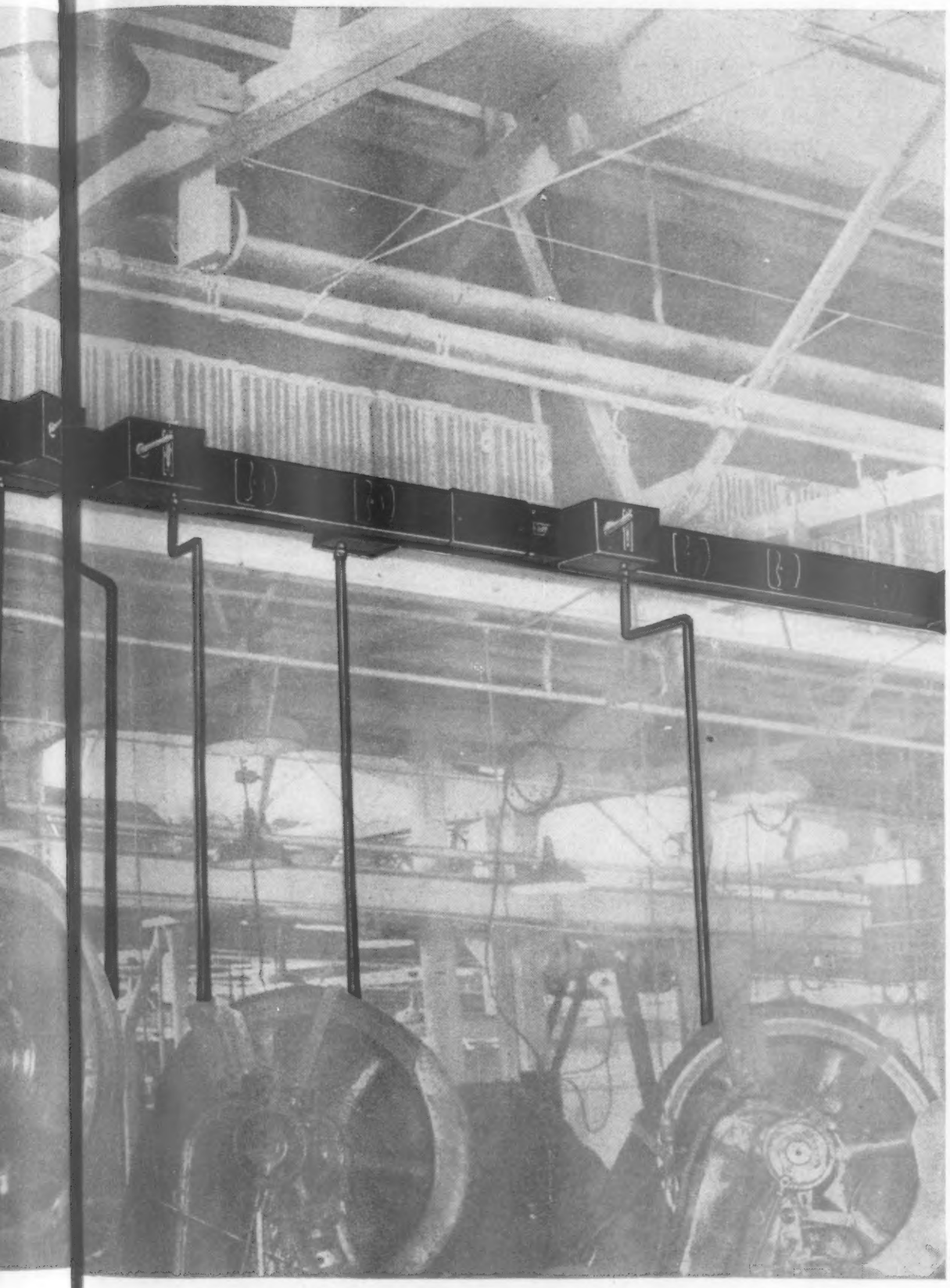
ELECTRIC PRODUCTS COMPANY

ADEQUATE WIRING SERVES AND SAVES

B.E.P.Co.

Detroit 32, Michigan. Field Offices In All Principal Cities. In Canada: BullDog Electric Products of Canada, Ltd., Toronto

costs – today



Meet today's needs—and matc tomorrow's—with BullDog BU tribution Systems... BUStributio DUCT for plug-in power and Ven tilated Lo-X Duct for feeder line

BullDog Lo-X Feeder Duct blocks tw blows at plant efficiency—voltag drop and temperature rise.

When voltage drop pinches you power supply, output of motors an lights must suffer. And dangerou temperature rise takes its toll on th life of your distribution system.

But BullDog Lo-X licks both these problems. Unique design an arrangement of the bus bars, plu adequate ventilation, insures max mum conductivity and rapid dissip tion of heat.

Economy doesn't stop there, eithe Rugged construction cuts maintenanc costs, and when major productio changes require alterations of you feeder lines, BullDog Lo-X can b dismantled, moved and reinstalle with complete re-use of all material

• • •

BullDog Plug-In BUStribution DUCT meets the challenge of change.

Machines can be moved and be back in production with minimum losses in time and in effort, thanks to the high flexibility of this modern branch circuit system.

Every ten-foot section of Plug-In BUStribution DUCT has ten convenient outlets. That means no re-wiring, no addition of fixed outlets. Electricians need only raise the plug to the nearest opening, snap its contact fingers over the bus bars and bolt the plug to the casing. The job can be done in a matter of minutes with no interru tions for the rest of the line.

Like all BullDog Bus Duct systems, BUStribu tion DUCT is made in prefabricated, standard ized sections for easy installation and for di mantling and reinstallation without scrappin any parts.

You can see the advantages of BullDog Lo-X Feeder Duct and Plug-In BUStribution DUC firsthand by calling a BullDog Field Enginee Or, just write BullDog direct for detailed folder

CORRECT LIGHTING IS *fitted* TO THE PERSON ...TO THE JOB

The man at the bench needs concentrated light. The typist wants illumination over a greater spread. The lighting *you* might prefer would probably differ from that suitable for an inspector, draftsman or operator of a bookkeeping machine. How, then, can you provide efficient localized lighting for such varied conditions?

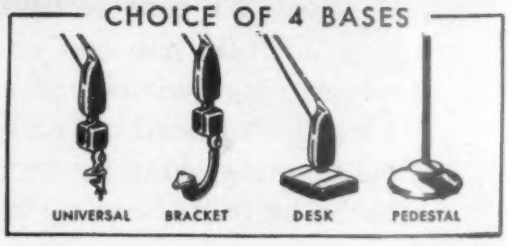
You'll find your answer in the Dazor *Floating* Lamp. For Dazor lighting is individually fitted to the user, to the job. Each employee gets *enough* light for clear, easy seeing . . . light that is *properly placed* to free eyes from the strain of shadows and glare. With no more effort than pointing a flashlight, the hand *floats* the Dazor reflector to any desired position. Held firmly by the patented Dazor *Floating* Arm, it stays until purposely shifted.

By installing this personalized lighting for precision work in shop or office you encourage higher production, curb errors and waste, promote well-being and safety. And note, please, that modern design makes the Dazor Lamp an *attractive* addition to your equipment.

Phone Your Dazor Distributor for more detailed information or a demonstration. If unacquainted with this distributor of improved lighting, write for his name to Dazor Manufacturing Corp., 4481-87 Duncan Ave., St. Louis 10, Mo. *In Canada* address inquiries to Amalgamated Electric Corporation Limited, Toronto 6, Ontario.

DAZOR FLOATING LAMPS

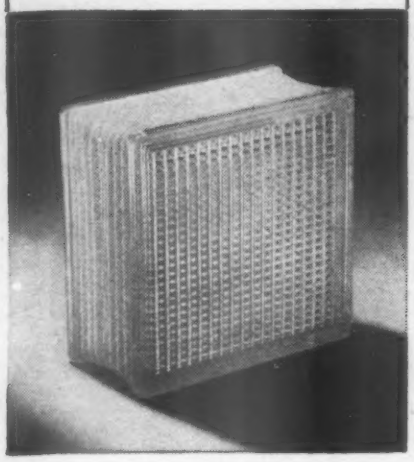
FLUORESCENT and INCANDESCENT



OWENS-ILLINOIS

INSULUX

GLASS BLOCK



Insulux Glass Block is manufactured in three sizes—many attractive and functional face patterns. This modern material has solved problems for many businesses. Investigate!

→ **Sash** replacement with Insulux Glass Block in the Kansas City Flour Mills was a logical step in economical modernization . . . and lowered maintenance.

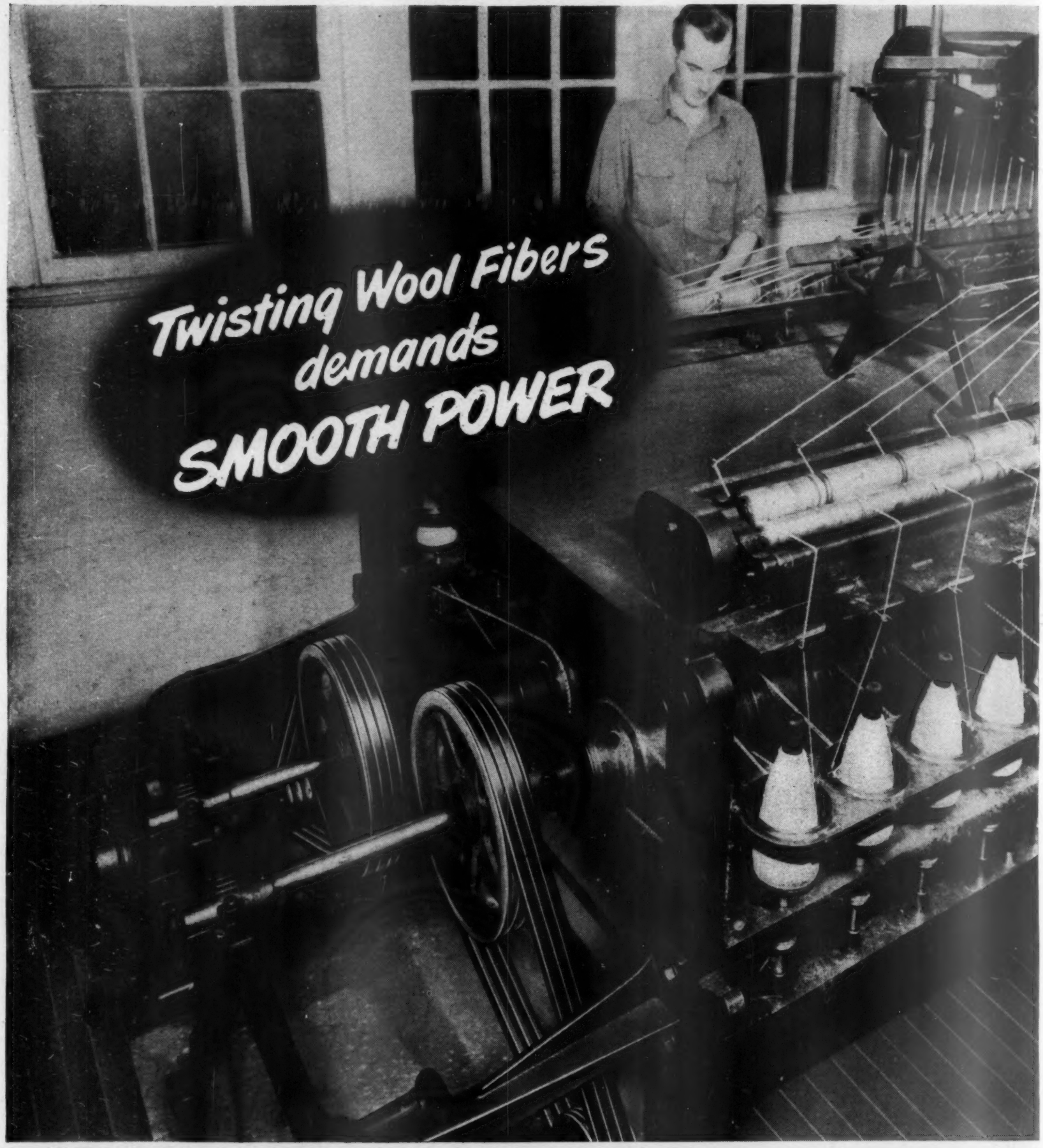
Modernization with an eye to maintenance . . .

WHEREVER buildings are being modernized, daylighting is improved and maintenance costs radically lowered by the use of Insulux Glass Block.

Insulux requires no painting, will not rot, rust, or corrode. Panels of Insulux may be cleaned simply, quickly, thoroughly, with a damp cloth. Painting is not required for its preservation.

The high insulating value of Insulux makes it possible to use less heating equipment and fuel. The good light transmission and dispersion properties of Insulux save electricity through the reduction of artificial illumination. Operation of air conditioning equipment is less costly.

Keep the fact in mind that Insulux is an entirely different building material, designed to do things other materials will not do. Investigate the important part Insulux can play in making your maintenance problems easier, your operating expense considerably lower. A letter will bring you detailed information. Insulux Products Division, Owens-Illinois Glass Company, Dept. D-48, Toledo 1, Ohio.



A leading mill supply house near you stocks Dayton V-Belts . .
Look for the name in the yellow pages of your telephone directory

Dayton

THE MARK OF TECHNICAL

THE WORLD'S LARGEST

WHY DAYTON V-BELTS *Start and Run Smoothly*

Machines that twist wool fibers and run the yarn onto spools are delicate. Power drives must start and run smoothly or machines quickly get out of order. In the plant of a manufacturer of papermakers' felts, rough starting and stopping, plus the slipping of the original power drive on a twister machine, caused it to be out of operation frequently for hours at a time. Loss of production was serious. Then, five years ago, a Dayton V-Belt Drive was installed. Since then the twister has not been out of service once due to power drive failures.

Dayton V-Belts start, run and stop smoothly because they wedge themselves in the pulley groove, thereby absorbing the shocks of suddenly applied power when motors are started or when peak loads suddenly come on. Smooth starting is one of many reasons why Dayton V-Belts can help you solve your power transmission drive problems efficiently and economically. Your Dayton Distributor will gladly help you. Call him today.

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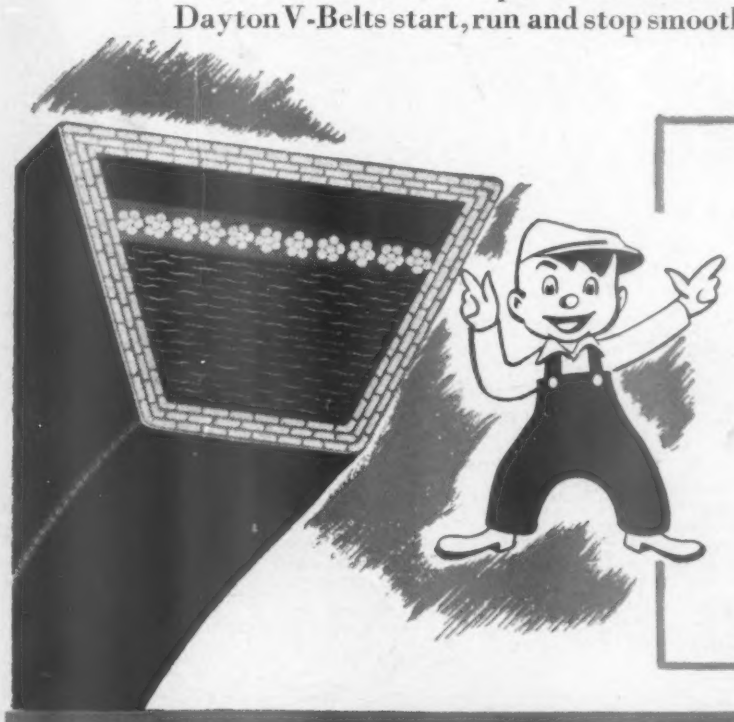


NOW! *Rayon Cords
PROVIDE DAYTON V-BELTS WITH

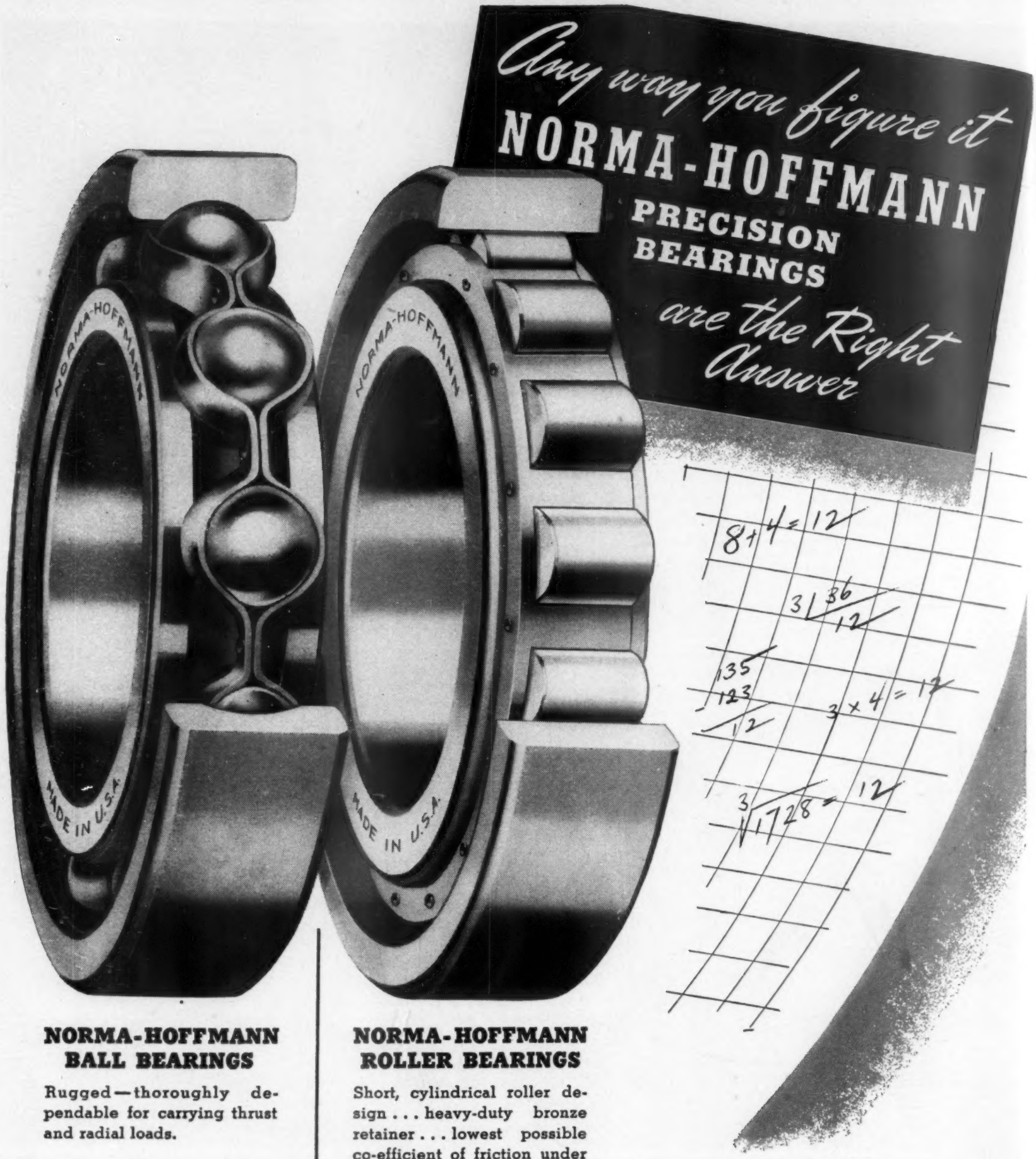
1. MINIMUM STRETCH
2. GREATER FLEX STRENGTH
3. LONGER V-BELT LIFE

*Rayon cords are specially processed by Dayton for use in V-Belts to provide the most efficient and economical power transmission service for your needs. For the complete story, write for booklet A-469.

Rubber

EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

MANUFACTURER OF V-BELTS



NORMA-HOFFMANN BALL BEARINGS

Rugged—thoroughly dependable for carrying thrust and radial loads.

NORMA-HOFFMANN ROLLER BEARINGS

Short, cylindrical roller design . . . heavy-duty bronze retainer . . . lowest possible co-efficient of friction under heavy load.

Norma-Hoffmann heavy-duty Bearings improve the design and performance of products wherever they are used. They are dependable, give friction-free smoothness and quietness of operation. Available in a wide range of sizes for every load, speed and duty. Write for catalog and engineering assistance.

NORMA-HOFFMANN
Precision **BEARINGS**
BALL • ROLLER • THRUST

NORMA-HOFFMANN BEARINGS CORPORATION
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FIELD OFFICES: New York, Chicago, Cleveland, Detroit, Pittsburgh, Cincinnati, Los Angeles, San Francisco, Seattle, Phoenix

GAS SHORTAGE SEEN SEVERE AGAIN NEXT WINTER!

By the United Press.

WASHINGTON, May 5.—The natural gas shortage next winter will be as prolonged and severe as it was last year, the Federal Power Commission predicted today, stating that a shortage of steel pipe has created a bottleneck in supply.

The coming shortage will extend from the Rocky Mountain States to New York State, its survey indicated. Virtually all the large industrial cities in Ohio and Western Pennsylvania, New York, Western Maryland and West Virginia must look forward to continued and severe restrictions on the use of gas next winter, the Commission warned today.

TO PREVENT PLANT SHUTDOWNS SPECIFY PGC STANDBY TODAY

There is still time to prevent production curtailment due to gas shortages . . . still time to be sure that *your* plant will operate during fuel emergencies. A PGC automatic propane-air standby plant will give you that complete protection. It clicks on automatically when needed, and furnishes a completely interchangeable gas requiring no appliance adjustments.

INDUSTRY SPECIFIES

P.G.C.

FOR STANDBY

Over 500 PGC industrial and gas utility installations in 36 states testify that this packaged gas plant performs efficiently under all circumstances.

A PGC installation will pay for itself through savings on uninterrupted production . . . savings in demand charges . . . greatly improved management-labor relations . . . community-wide recognition resulting from uninterrupted production while all others shut down.

PGC engineers are ready to serve you. Call or write today!

Pacific Gas Corporation

SPECIALISTS IN LIQUID PETROLEUM GAS • MARKETING • ENGINEERING • UTILIZATION

Rockefeller Center • 630 Fifth Avenue • New York 20, N. Y. • Denver • Los Angeles • San Francisco **GASAIR DIVISION**

How to Stop-Watch a Production Race

TIME the handling operations in your plant—then compare total handling time with total production time. If handling methods are obsolete, you'll find that handling is wasting much of the time saved by modern production machinery.

Cut the corners on handling operations — Towmotor Fork Lift Trucks and Accessories will do it for you — and you'll increase productive output and come out far ahead in the production race. A Pocket Catalog lists the Towmotor Fork Lift Truck or Accessory that will modernize handling in your plant . . . send for your copy now. Towmotor Corporation, Division 5, 1226 East 152nd Street, Cleveland 10, Ohio.

***SEND FOR SPECIAL BULLETINS DESCRIBING THE* TOWMOTOR** REVOLVING CARRIAGE • SIDE SHIFTER UNLOADER • UPENDER • SCOOP • CRANE ARM • EXTENSION FORKS • EXTENSION BACKREST • RAM • OVERHEAD GUARD

TOWMOTOR *THE ONE-MAN-GANG*

FORK LIFT TRUCKS *and* TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

BEWARE
OF MAD SHORT CIRCUITS...

Protect Your High-voltage Motors with LIMITAMP CONTROL

Limitamp quickly and easily brings these mad short circuits under control. In less than *one-quarter* cycle, Limitamp's EJ-2 fuses cut off a rise in current from a short, and clear it in one-half cycle—long before the fault current has time to harm the contactor or motor. Your plant's power system needs this prompt handling of fault currents, and you will avoid the risk of costly shutdowns that can result from *one mad short circuit.*

A STARTER AND PROTECTOR IN ONE CABINET

G-E Limitamp control consists of an air-break contactor (the motor starter), and EJ-2 fuses (the short-circuit device). They are mounted in separate compartments of one, all-steel cabinet. Air-break contactors are specially designed for hard duty. Operating experience has proved that they furnish dependable, long-lived, low-cost service with only routine inspection.

Because they operate in air, they eliminate the problem of handling oil. And tip life of air-break contactors is many times that of comparable oil-immersed tips.

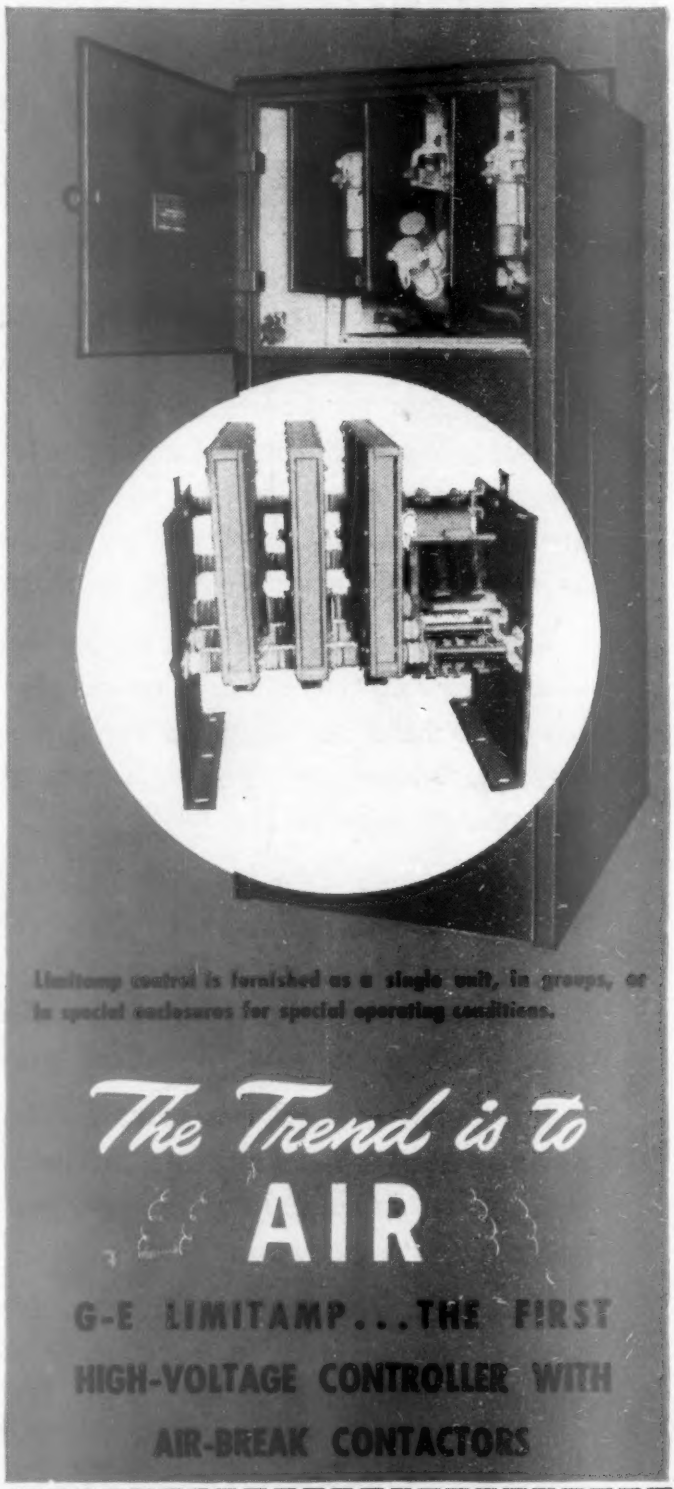
EJ-2 fuses are easy to replace, and they can't wear out. When you install a new fuse, you know your short-circuit protective device is in perfect condition.

OVERLOAD AND UNDERVOLTAGE PROTECTION

Isothermic overload relays, accurately calibrated against actual motor characteristics, guard the motor against overheating from sustained loads or single phasing.

FACTORY-ASSEMBLED CONTROL

Factory-assembled in one cabinet, Limitamp is easy to install, easy to co-ordinate with other control, saves space, and improves the appearance of your plant.



Limitamp control is furnished as a single unit, in groups, or in special enclosures for special operating conditions.

The Trend is to **AIR**

G-E LIMITAMP...THE FIRST HIGH-VOLTAGE CONTROLLER WITH AIR-BREAK CONTACTORS

GENERAL ELECTRIC

Apparatus Dept.,
General Electric Company, H676-246
Schenectady 5, New York

Please send me Bulletin GEA-4247, describing Limitamp control.

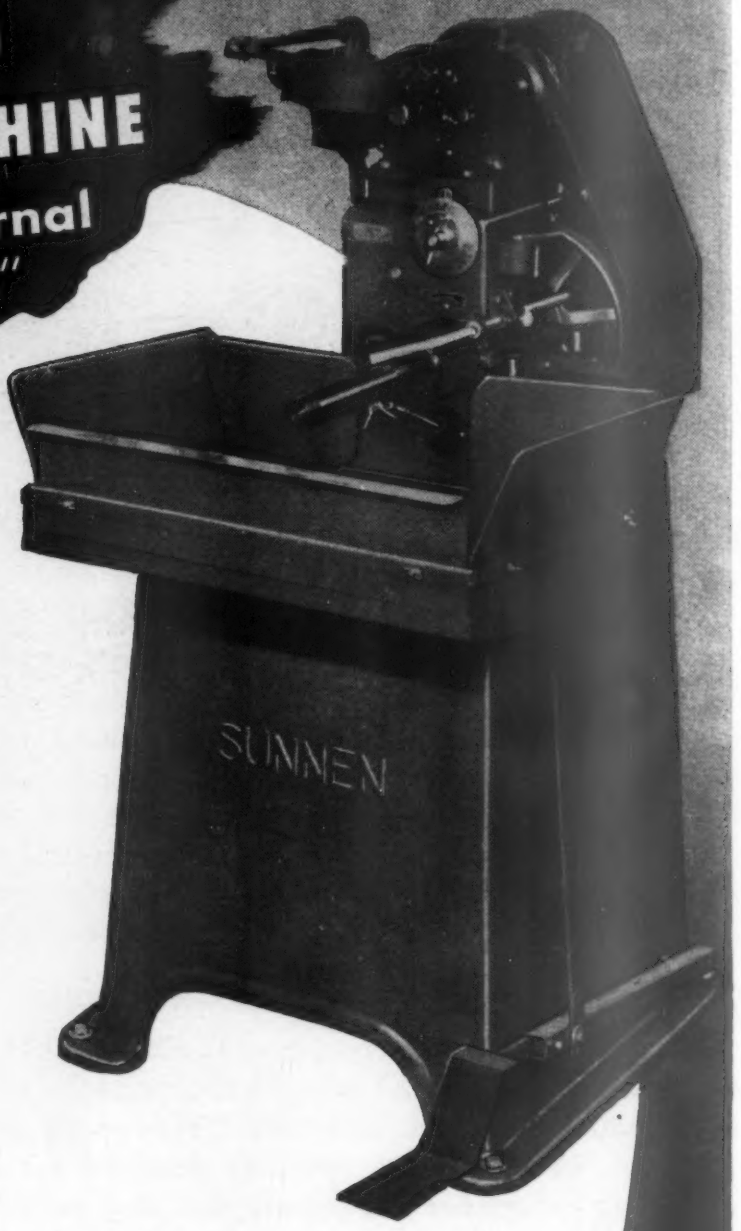
Name .....

Company .....

Address .....

With a Small Investment—

the SUNNEN
PRECISION HONING MACHINE
Will Accurately Finish All Internal Diameters from .125" to 2.625"



The wide range of sizes which the Sunnen Precision Honing Machine will handle makes it adaptable to thousands of jobs in production plants, tool and die shops, maintenance shops and salvage departments. Honing heads and stones are available to hone any kind of metal, plastic or ceramic material except lead and babbitt.

Accuracy is guaranteed to be within .0001" — and on such materials as hardened steel it has been held to .000025" on production jobs. Surface finishes can be produced to meet any commercial requirement.

In thousands of shops the Sunnen Precision Honing Machine produces finishes that add extra life to bearing surfaces, saves material because it reduces rejects, and assures absolute interchangeability on closely mated parts.

The Sunnen Precision Honing Machine does not require skilled help — anyone who is mechanically inclined can learn to operate it in a few hours. No jigs or fixtures are needed — it can be put to work immediately. It is economical to operate.

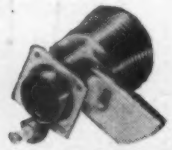
A Sunnen engineer will be glad to show you how you can apply Sunnen honing to your jobs, in your plant. Call him in, or write for complete details. Ask for bulletin XSP5000.

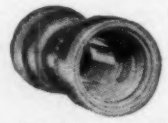
SUNNEN PRODUCTS COMPANY, 7938 Manchester Avenue, St. Louis 17, Missouri
Canadian Factory: Chatham, Ontario

Typical Examples

Universal bearing honed to 10 micro inch finish gives longer service.

Line reamer bushings, diameter 2.375", accuracy held to .0001".


Miniature aircraft cylinder — smooth, accurate honing provides better compression and longer life.


Aviation Hydraulic Cylinder made of Aluminum-Alloy. Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.

Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface.

Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.

Hydraulic Two-Way Control Valve. Hole is honed to eliminate leakage.

SUNNEN

194

Does turbine oil acidity keep you awake nights?

NONPAREIL
TURBINE OIL

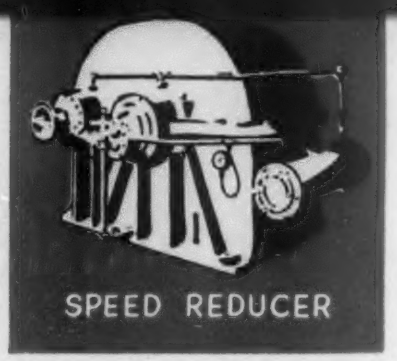
ARE YOU periodically faced with the problem of determining how long you can run a fill of turbine oil before replacing it or treating it to reduce acidity? Do you have to watch turbine oil acidity constantly to avoid turbine deposits and poor oil demulsibility? If so, an oil that is *guaranteed* not to become excessively acid will end your worries—save time and labor too.

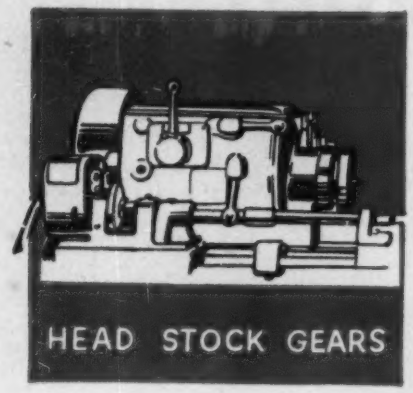
Nonpareil Turbine Oil is guaranteed not to exceed the low neutralization number of 0.15 mg KOH/gm for the life of your turbine. Actual oil records on all types of turbines over the past 18 years give ample proof that this guarantee assures low oil maintenance costs and trouble-free lubrication.

When you use Nonpareil, samples of the oil are tested by Standard Oil at regular intervals. These tests determine acidity, demulsibility, viscosity, and other significant facts about the condition of the oil. By these periodic checks and the guaranteed, low acidity you are relieved of all concern about your turbine oil. A Standard Oil Lubrication Engineer will explain fully this service and guarantee. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

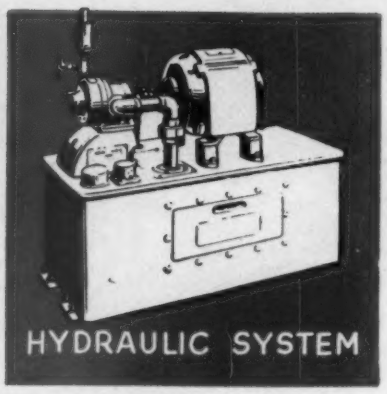
Count how many places in your





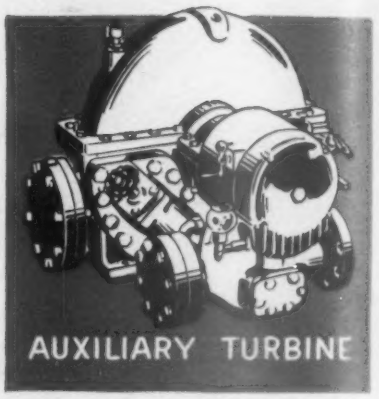
plant Stanoils can be used.

Find out how



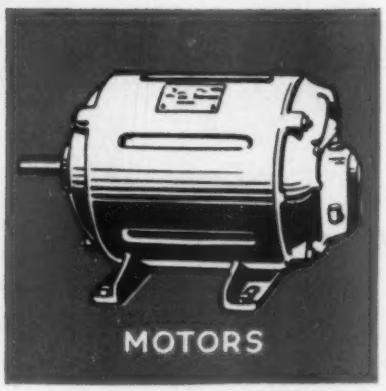
Stanoils frequently

can replace costly special-purpose



oils...can give equally good or better

lubrication, and, at the same



time,

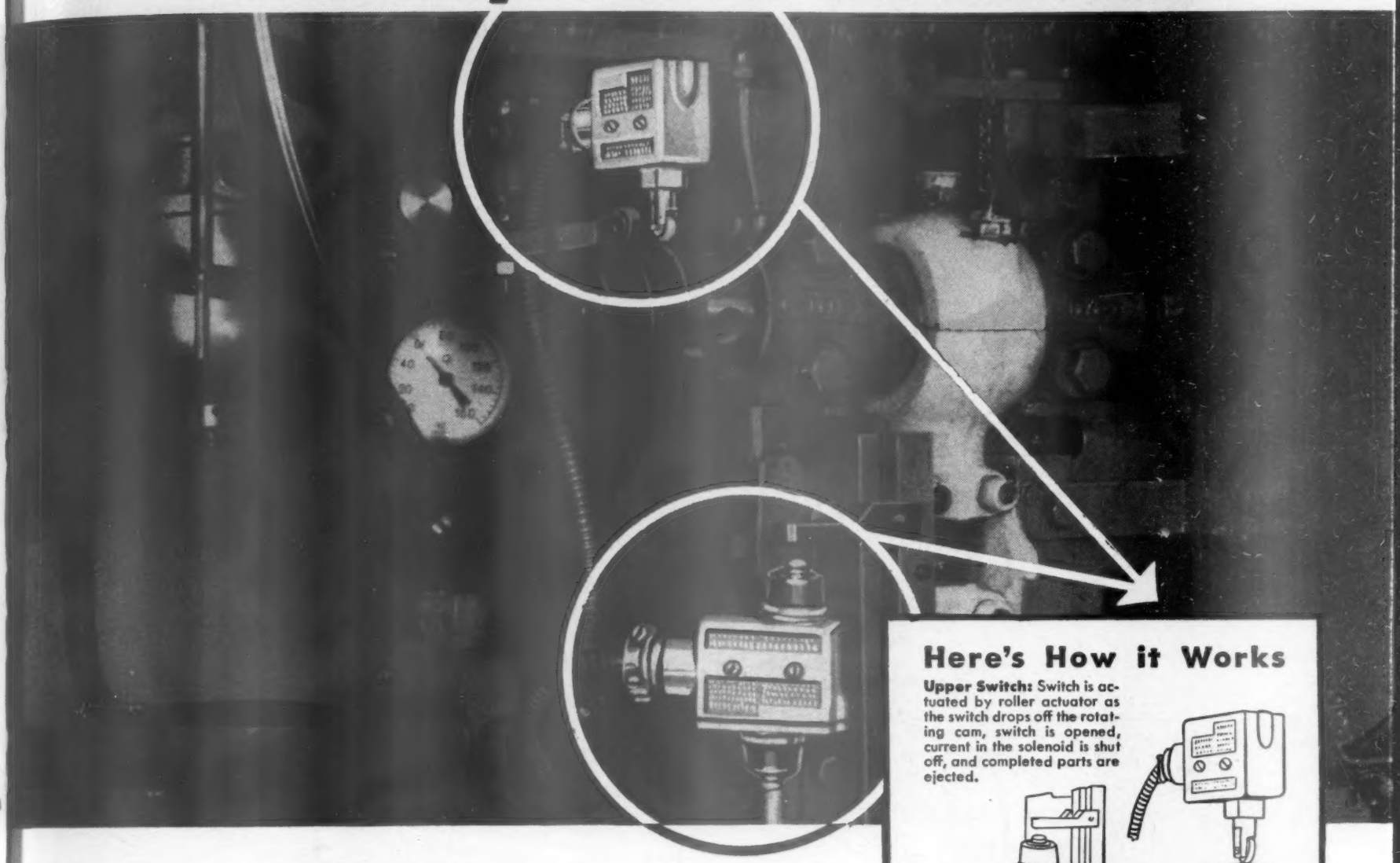
reduce the number of oils you must stock.

Call the nearest Standard Oil Company (Indiana) office for a Lubrication Engineer. Ask him to make a survey of your plant. He can tell you where you can put Stanoils to work and why you'll get better lubrication.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

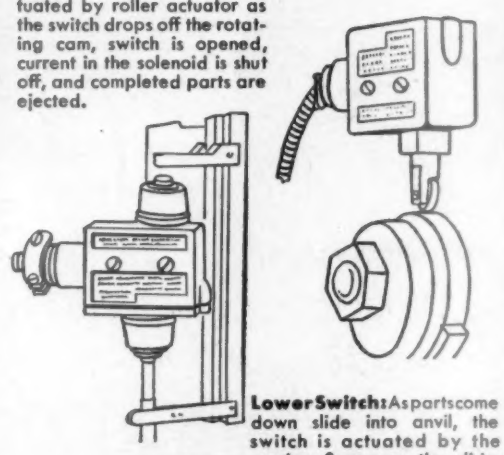
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

Installing MICRO Precision Switches makes *Operations Automatic*



Here's How it Works

Upper Switch: Switch is actuated by roller actuator as the switch drops off the rotating cam, switch is opened, current in the solenoid is shut off, and completed parts are ejected.



Lower Switch: As parts come down slide into anvil, the switch is actuated by the moving finger on the slide. The switch is connected with relay that operates solenoid air valve and controls feed.

● More and more, plant engineers, shop superintendents, and time study men are discovering that the use of MICRO Precision Switches in present equipment can be a big factor, saving man hours, stepping-up production and cutting production cost.

With the addition of MICRO Precision Switches, automatic operations were added to the above illustrated punch press which stakes and serrates silver contacts on springs.

These switches were added by the plant engineer, which is common practice today, as many manufacturers are interested in the savings to be had by making operations automatic.

In addition, MICRO Precision Switches can be added by plant engineers as safeties, limit controls, interlocks and for varied other uses. The thumb nail sketches to the right quickly show the method of operating these MICRO Precision Switches.

The MICRO Precision Switch line has a wide selection of ready-to-use switches with just the electrical characteristics, actuators and protective housings for installation on your present operating machines—to make them automatic, to act as machine limit and as safeties. If you would like to improve your present equipment with MICRO Precision Switches, write or call the nearest MICRO Switch branch or sales representative as listed below.

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We can recommend without qualification, your Spray-Day-Lite paint to anyone who needs good paint for their factory.

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Some people say, when they first see the rugged chassis and construction details of electric industrial trucks: "But you make them *too* strong! Why not build them lighter and cut the price?"

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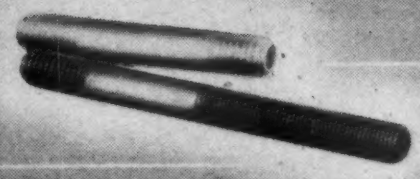
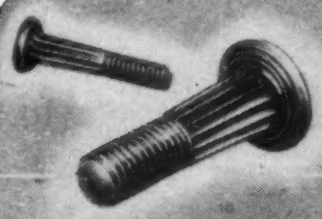
LAMSON LOCK NUTS—One-piece, all-steel—can be re-used repeatedly

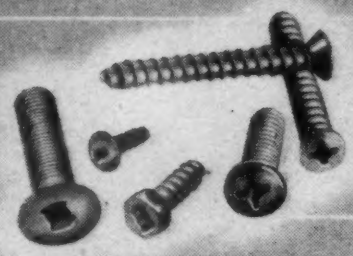


MILLED STUDS in a full range of sizes

DARDELET RIVET-BOLTS with the locking thread . . . time savers for steel construction



WEATHER-TIGHT Bolts—*modern* fasteners for wood assemblies—eliminate counterboring



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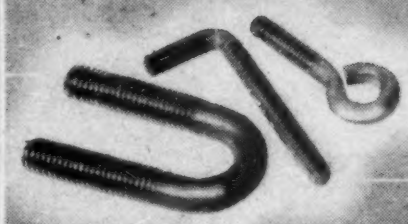
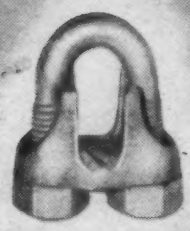
PLACE BOLTS—for locking assemblies rigidly

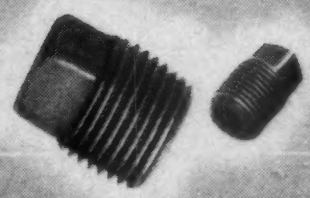
"1035" SET SCREWS of hi-tensile heat-treated steel, square head or headless



"BENT" Bolts, including U Bolts, J, L, Hook and Eye Bolts

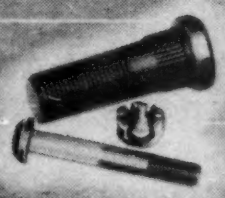


WIRE ROPE CLIPS with the new Hi-Center Saddles and extra-strength U Bolts



PIPE PLUGS, square head and headless; forged steel, heat-treated

LOK-THRED Studs and Pipe Plugs—Thread *locks* and *seals* in standard tapped holes



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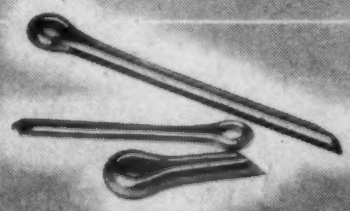

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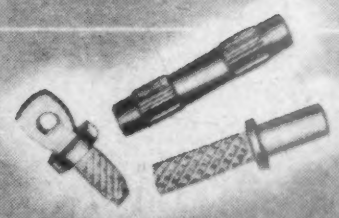

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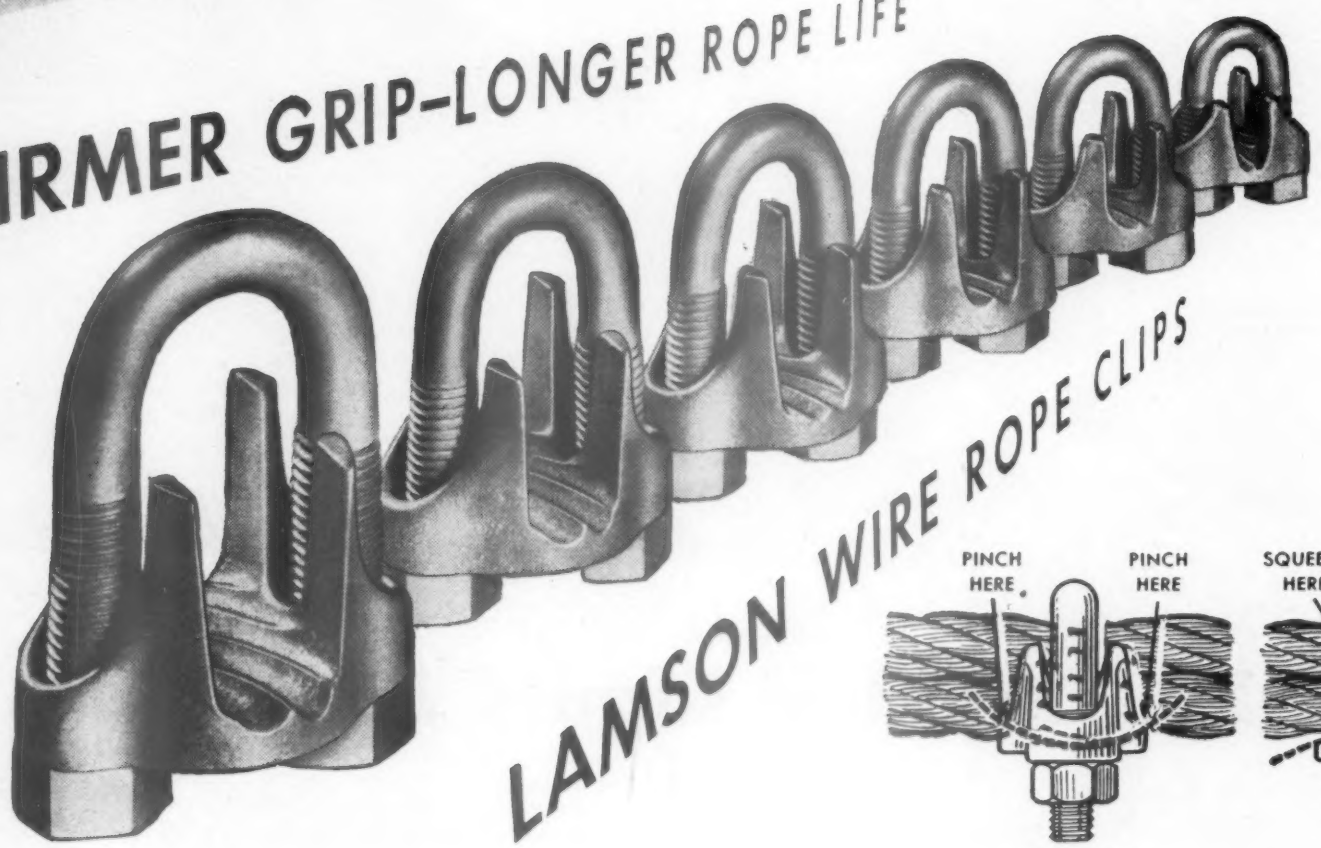
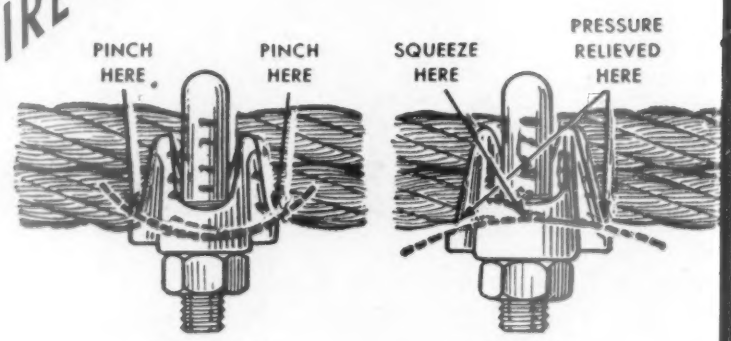
RAISED IN THE SADDLE!

FIRMER GRIP–LONGER ROPE LIFE



LAMSON WIRE ROPE CLIPS



ORDINARY DESIGN

LAMSON "RAISED SADDLE" DESIGN

LAMSON "Bull Dog" Wire Rope Clips perform like champions when "the squeeze is on". The secret of their efficiency lies in the exclusive "Raised Saddle" design which distributes the holding pressure along the center portion of the rope "seat". The edges of the saddle are rounded downward —thus eliminating the rope-wearing "pinch" and chafing of conventional clips.

The drawing above graphically illustrates the superiority of the Lamson "Raised Saddle" design. Note these outstanding and exclusive features:

1. Saddle curves downward at edges thus relieving pressure and "pinch" on wire rope . . . particularly when rope enters clip at an angle.
2. Clip is thicker, and therefore stronger, at central, raised portion of the rope seat. This allows for greater tightening of the clip and a consequent stronger no-slip grip.
3. "U" bolt nuts will not tend to loosen up with use as with ordinary clips . . . even when the strain on the rope is released or reversed.

For the sake of safety, economy and efficiency, you'll be way ahead to specify Lamson "Bull Dog" Wire Rope Clips.

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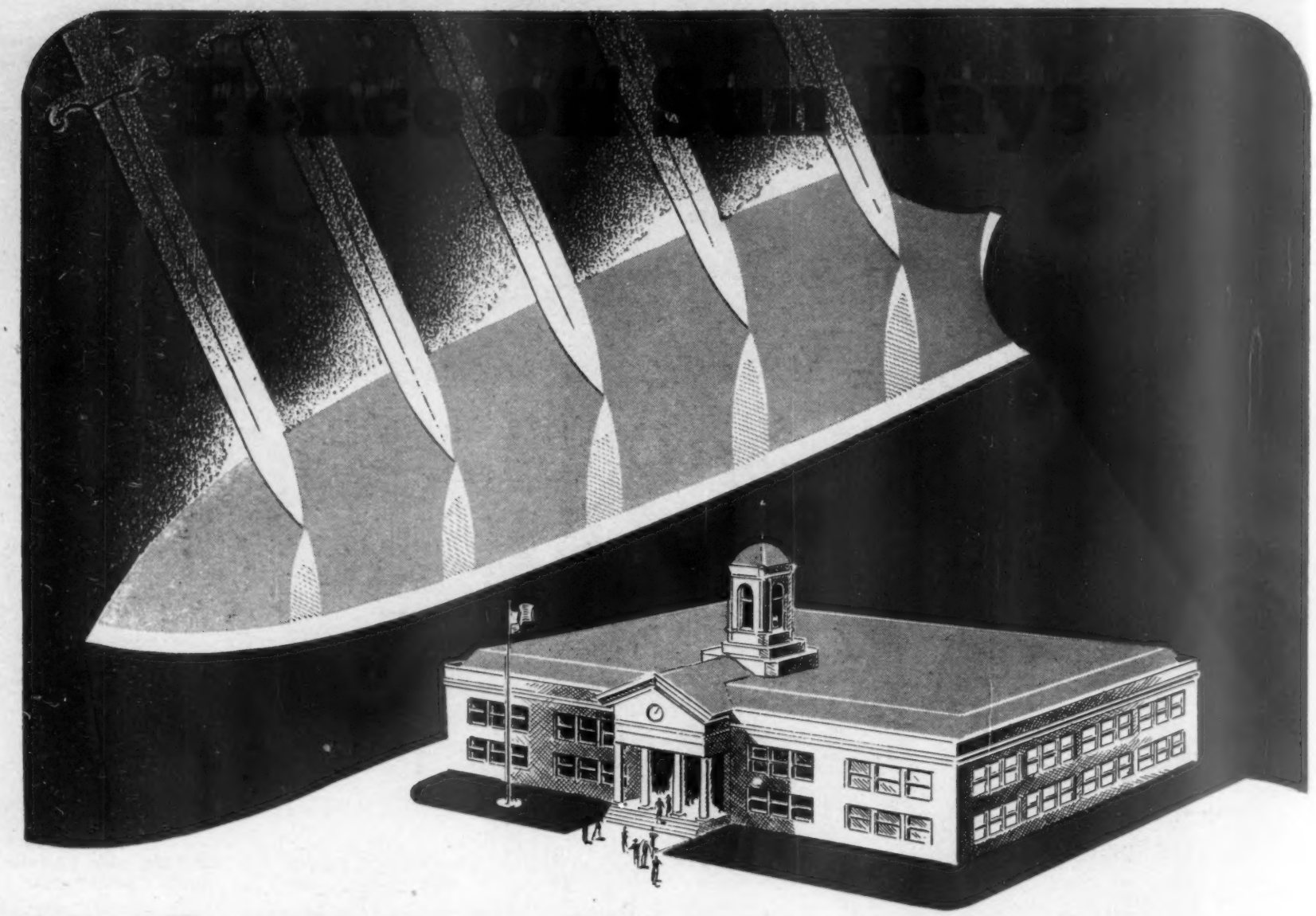

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For best results insist on aluminum roof coatings of standard quality made from Reynolds Special Roof Coat Pigments, formulated only with a proper type of vehicle. Back of these pigments is a quarter-century of leadership . . . Reynolds scientific "know-how" in the production of pastes and powders for the protection of industrial and public roofs.

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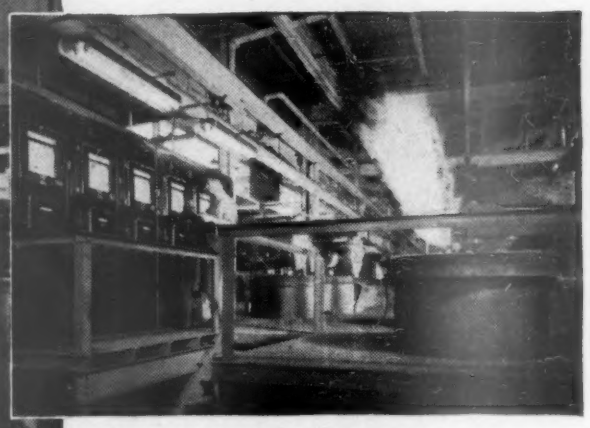
ROOF COATINGS OF LIQUID ALUMINUM

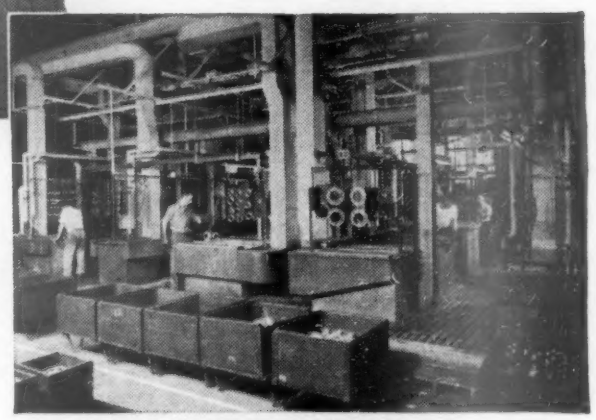
1988-P6-6B

FACILITIES TO PRODUCE THE *Gears* YOU NEED

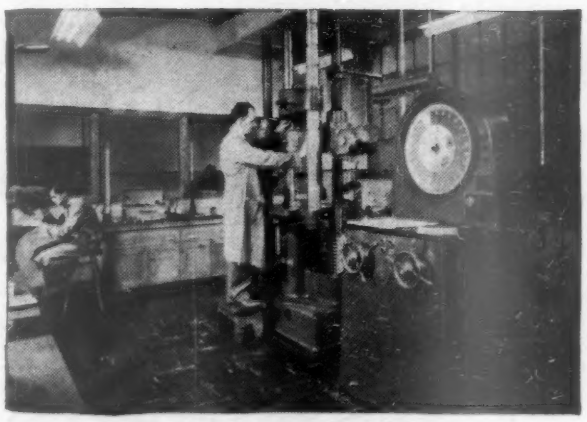
Controlled atmosphere furnaces; quenching presses in the foreground



Carburizing and nitriding furnaces



Section of plating department



Physical testing laboratory to provide control of heat treating

. . . take heat treating for example

If you use gears—spur—helical—worm or bevel—Foote Bros. can fill your needs. In two large plants, you will find the latest in modern machinery backed by nearly a century of manufacturing skill to produce gears for practically every requirement. Giant gears 20 feet in diameter for cement kiln or sugar mill drives. Extremely high precision gears for aircraft engines. Industrial gears for gas or diesel engines, tractor transmissions, mining and construction machinery, machine tools or any industrial application.

Typical of the completeness of the facilities of Foote Bros. is the heat-treating department.

In this department are facilities to bright copper plate—Rochelle salt copper plate—cadmium plate—tin plate and dichromate.

Here are carburizing and nitriding furnaces to gas carburize, liquid carburize, cyanide and nitride.

Controlled atmosphere furnaces permit exact control of hardening. They normalize to relieve forging stresses and anneal and temper to provide stress relief after hardening or grinding.

In addition to heat-treating equipment, this department has Gleason and Hannifin Quenching Presses for distortion control—facilities for sub-zero treatment—and facilities for shot peening to increase fatigue life.

The completeness of heat-treatment control is an indication of facilities in every department of Foote Bros. available to gear buyers. We welcome inquiries for any type of gear in any quantity to meet your needs.

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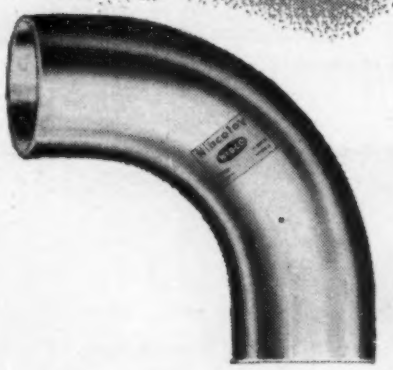
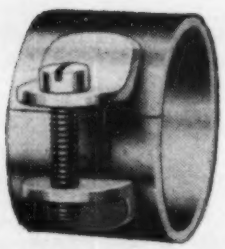
Patent Numbers
2,027,285 — 2,111,695

Nibcoloy wrot fittings



90° ELBOW



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ECONOMICAL LIGHT GAUGE TUBES

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NORTHERN INDIANA BRASS COMPANY
ELKHART, INDIANA

WRITE FOR CATALOG NUMBER 900

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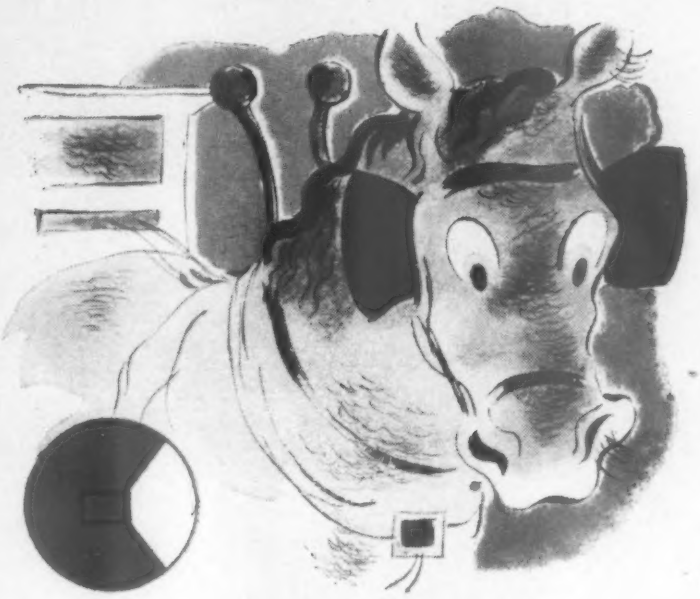
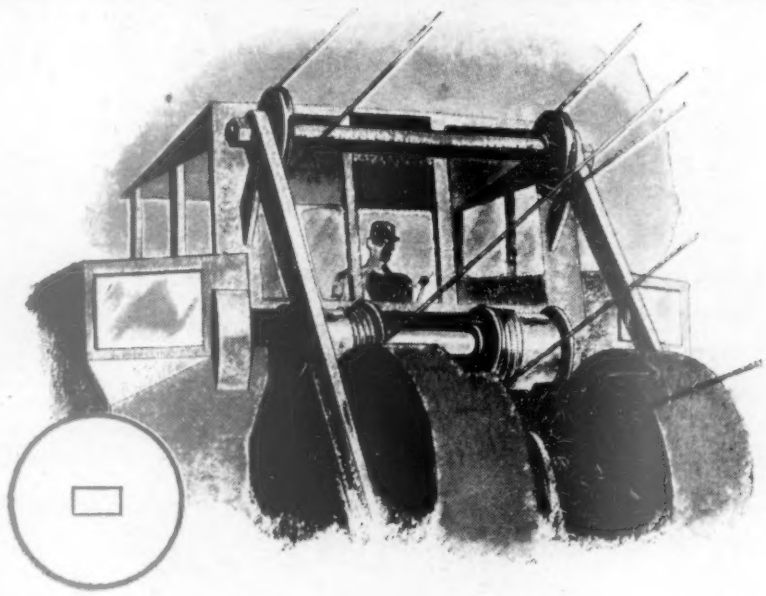
NO BLIND SPOTS WITH BROWNHOIST 360° VISIBILITY



The horse with blinders is extremely limited as to visibility. He can see in only one direction—straight ahead. He has to stretch his neck to see what's happening on either side or to the rear.

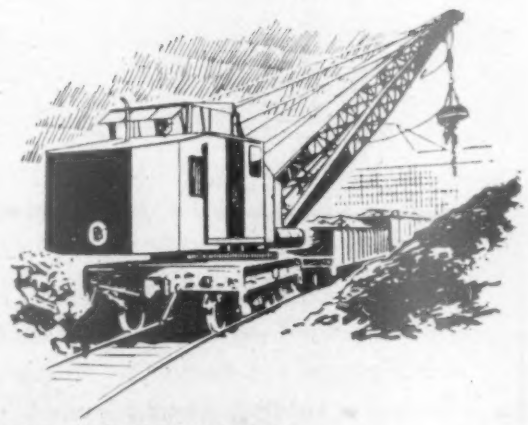
The truck driver has better visibility. He can easily see straight ahead and on both sides. But he has to stretch his neck or use awkward mirrors to see what's going on behind.

The lighthouse keeper has maximum visibility—360°. No obstructions, no blind spots. He can instantly see what's going on in any direction—front, rear, and both sides.



That's the kind of visibility the patented Monitor-type cab affords the Brownhoist Diesel Locomotive Crane operator—360°. No guesswork, no awkward maneuvering.

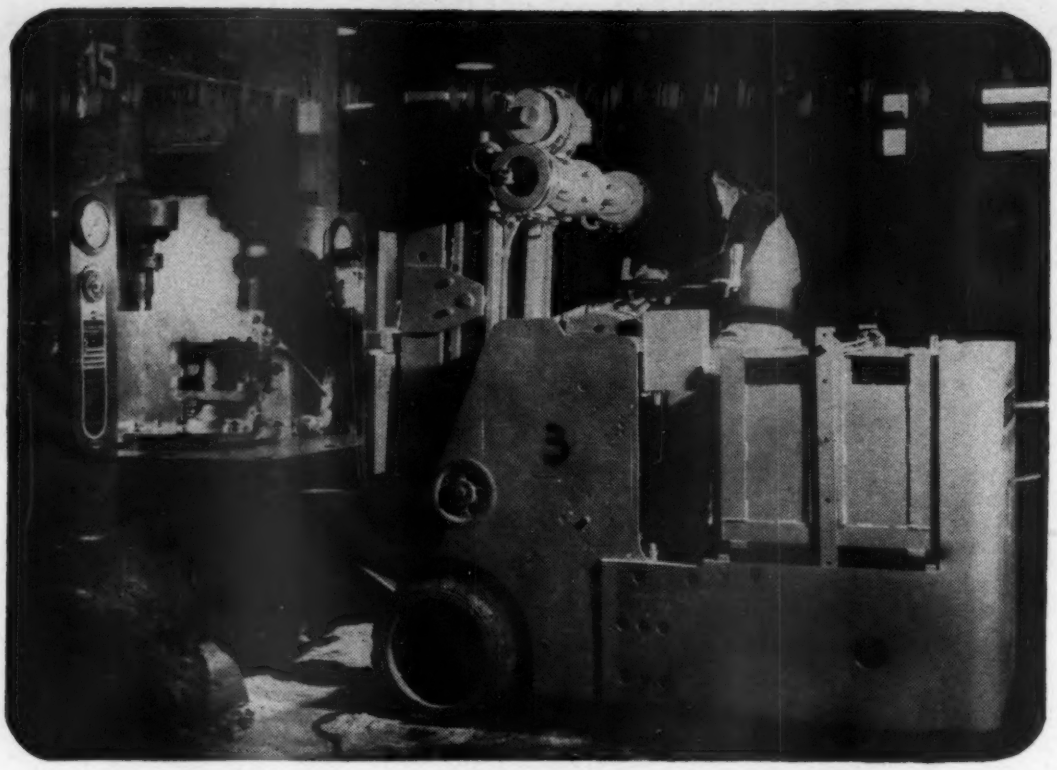
Full circle visibility from the cab of a Brownhoist Locomotive Crane means faster—safer—more efficient materials handling. But that's only one of the many Brownhoist advantages. Others include sure, sensitive response to air controls that are right at the operator's finger tips; smooth operating rotating and travel friction disc clutches with one-point adjustment; anti-friction bearings at all essential points; one-piece cast steel bed; 14" safety clearance between rotating bed and car body. For swift economical material handling with hook, magnet, or bucket, you can depend on a Brownhoist Locomotive Crane. Write for complete particulars.



BROWNHOIST BUILDS BETTER CRANES

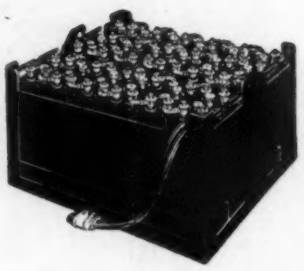
INDUSTRIAL BROWNHOIST CORP., BAY CITY, MICH. • District Offices: New York, Philadelphia, Cleveland, Chicago. Agencies: Detroit, Birmingham, Houston, Denver, Los Angeles, San Francisco, Seattle, Vancouver, B. C., Winnipeg, Canadian Brownhoist Ltd., Montreal, Quebec.

Handling Work is **STOP** *and* GO



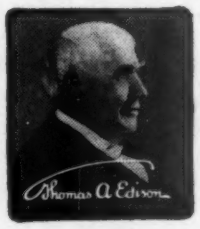
and Needs Instant-On-Off Power

In replacing a loaded skid box with an empty beside a machine, an industrial truck will make an average of approximately 14 moves forward, backward, up and down. A battery industrial truck has a natural advantage in this kind of stop-and-go service because it gets the necessary surges of power instantly from its battery, yet consumes no power during the stops. Thus it is not only economical of power, but the electricity used for charging its batteries is low-cost power.



Its electric-motor drive operates quietly, without vibration, and thus with well-nigh negligible repair requirements. With batteries exchanged two or three times per 24 hour day, it is continuously supplied with power and, since one battery is charged while the other works, the truck need not stop work for servicing of its power unit.

For 24 hour-a-day material-handling work, therefore, a battery industrial truck is an inherently dependable and economical machine, especially when powered by EDISON Nickel-Iron-Alkaline batteries. With steel cell construction, a solution that is a natural preservative of steel, and a foolproof electrochemical principle of operation, they are the longest-lived, most durable, and most trouble-free batteries. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey.* In Canada: *International Equipment Company Limited, Montreal and Toronto.*



EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

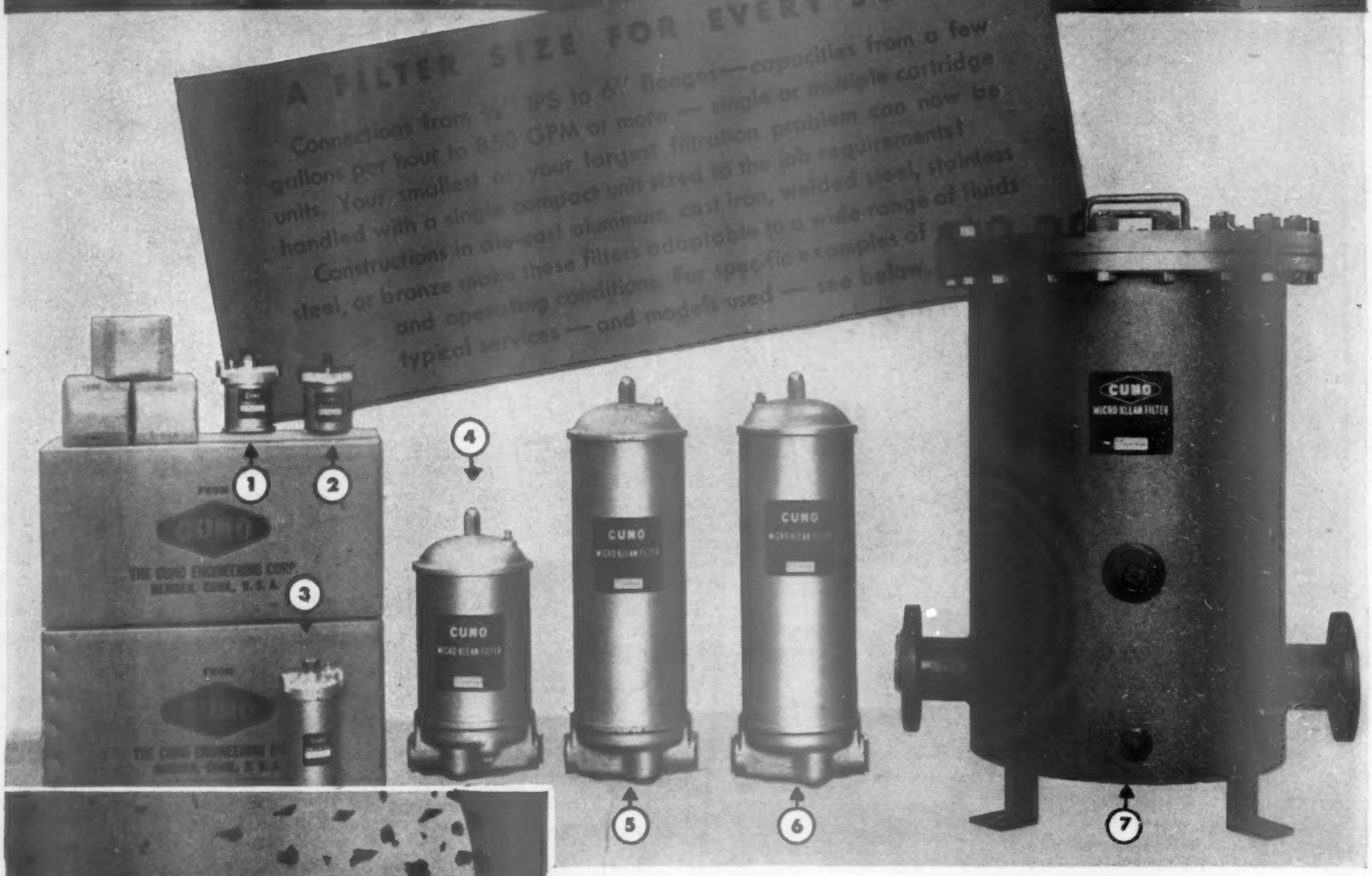
In Industrial Trucks, EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages.

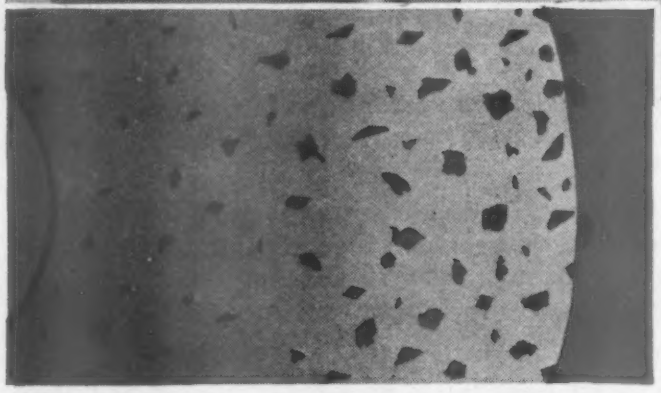
1. They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel. 2. They can be **charged rapidly;** gassing cannot dislodge the active materials. 3. They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place. 4. They are **simple and easy to maintain.** 5. They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling. 6. They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

YOU COLLECT DOUBLE

with MICRO-KLEAN Fluid Cleaning

Here's the micronic filter with the exclusive cartridge construction that saves 50% in cartridge replacement costs . . . because it collects double the quantity of solids before clogging.


A FILTER SIZE FOR EVERY JOB!
Connections from ¼" IPS to 6" flanges—capacities from a few gallons per hour to 850 GPM or more — single or multiple cartridge units. Your smallest or your largest filtration problem can now be handled with a single compact unit sized to the job requirements!
Constructions in die-cast aluminum, cast iron, welded steel, stainless steel, or bronze make these filters adaptable to a wide range of fluids and operating conditions. For specific examples of typical services — and models used — see below.
CUNO
MICRO KLEAN FILTER
1
2
3
4
5
6
7



1. Graded Density in Depth — a newly developed method of "felting" creates a structure in which spaces between fibres become progressively smaller and more numerous approaching discharge surface. Smaller particles penetrate to varying depths — no surface sealing.

2. Controlled Fibre Distribution — gives consistent, uniform, filtration characteristics.

3. Resinous-Impregnated and Polymerized — each fibre bonded in position to give structural strength. No channeling, rupturing, shrinking or distortion.

4. 85 to 90% Porosity — no structural components to waste space. RESULT: higher flow rates, greater dirt capacity, longer cartridge life.

Cuno Micra-Klean cartridges fit other makes of filters — increase efficiency.

CUNO

Fluid Conditioning

Removes More Sizes of Solids from More Types of Fluids

1. Model 1B1-2230: Adopted by leading machine tool manufacturer as standard equipment on grinding machine lube oil system. 250 # operating pressure.

2. Model 1C1-2230: Widely used on domestic oil burners.

3. Model 1B1G-2239: Air line filter as used by automobile manufacturer on plant air service.

4. Model 3A1-2278: For chemical manufacturer to filter light mineral oil solution of DDT.

5. Model 3A2-2278: All bronze model purchased by chemical manufacturer for process water in manufacture of stearates.

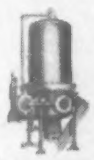
6. Model 3A2-2278: For manufacturer of electric motors to filter lubricating oil on test stands.

7. Model 30D2-2278: For manufacturer of transformers to handle petroleum solvent used in final cleanup and hydrostatic test of transformer housings.

Other Filters May Appear to Be Built This Way . . . But Only the Cuno MICRO-KLEAN Has All 4 Reasons for Double Life

For new bulletin on MICRO-KLEAN Filters, or to have Cuno representative discuss with you some specific fluid-cleaning problems, write (on your business letterhead) to Cuno Engineering Corporation, 612 South Vine St., Meriden, Connecticut.

AUTO-KLEAN
General service down to .0035". Disc-type. Continuously cleanable.



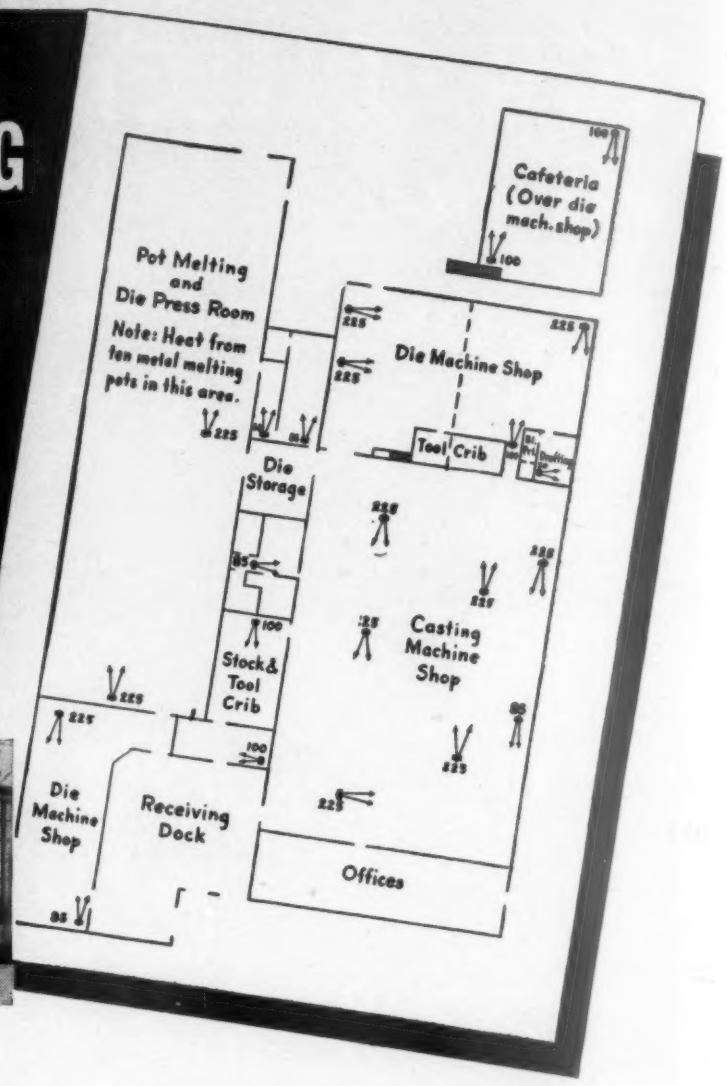
FLO-KLEAN
For highly abrasive solids down to .0025". Wire-Wound. Continuously cleanable.

MICRO-KLEAN
Micronic-type. Molded Fibre. "Graded Density in Depth" cuts replacement costs.

COOLANT-KLEAN
Low-cost unit filtration of grinder coolant. Fabric-type element.

COMPLETE PLANT HEATING THAT'S FLEXIBLE, TOO!

23 Janitrol Unit Heaters provide dependable heat for entire factory . . . are readily relocated for plant layout changes or expansion.



PRESSURE CASTINGS, INC.
die castings
ZINC AND ALUMINUM ALLOYS ★ SOLID DEPENDABLE ★ IVANHOE 5400
21500 ST. CLAIR AVENUE
CLEVELAND 19, OHIO

Surface Combustion Corporation
2375 Dorr Street
Toledo, Ohio

Gentlemen:-

About four years ago we replaced a coal fired boiler heating system, and direct radiation with Janitrol gas fired unit heaters throughout our plant. They have given us uniform heating and trouble free operation.

As we added to our plant, we installed additional units to make a total of twenty-three heaters.

They are readily relocated when plant changes are necessary.

Very truly yours,

Pressure Castings, Inc.

Marshall P. Ralls

Marshall P. Ralls
Purchasing Agent

mpr/af

TODAY'S rapidly changing industrial conditions demand plant *flexibility*. And you can't have flexibility in your plant unless your heating equipment is easily adaptable to changed layout, expansion, or partitioning. Janitrol Gas-Fired Unit Heaters provide this heating adaptability and *save you money 3 ways!*

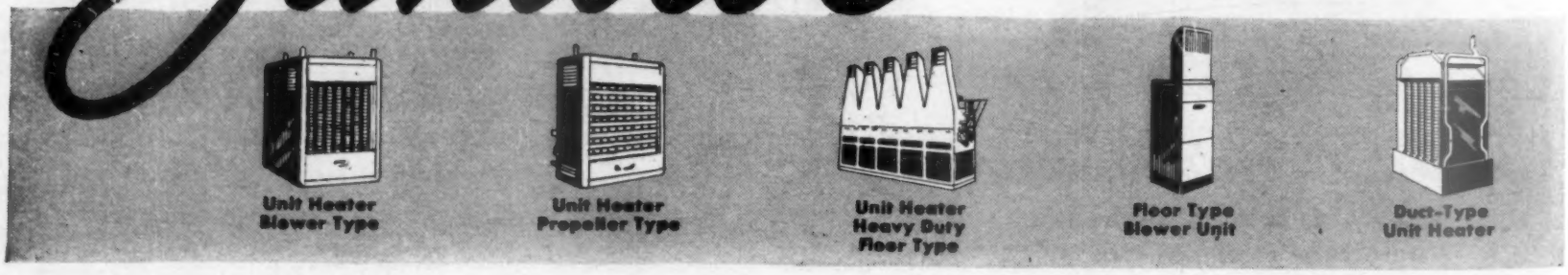
First, initial installation cost is low. No expensive building of ductwork is necessary. Just spot your heat where you need it.

Second, you save in operating and maintenance costs. Gas is economical when used efficiently. Janitrol gives you just the right amount of heat *automatically* and projects it in any direction required . . . costly overheating is eliminated.

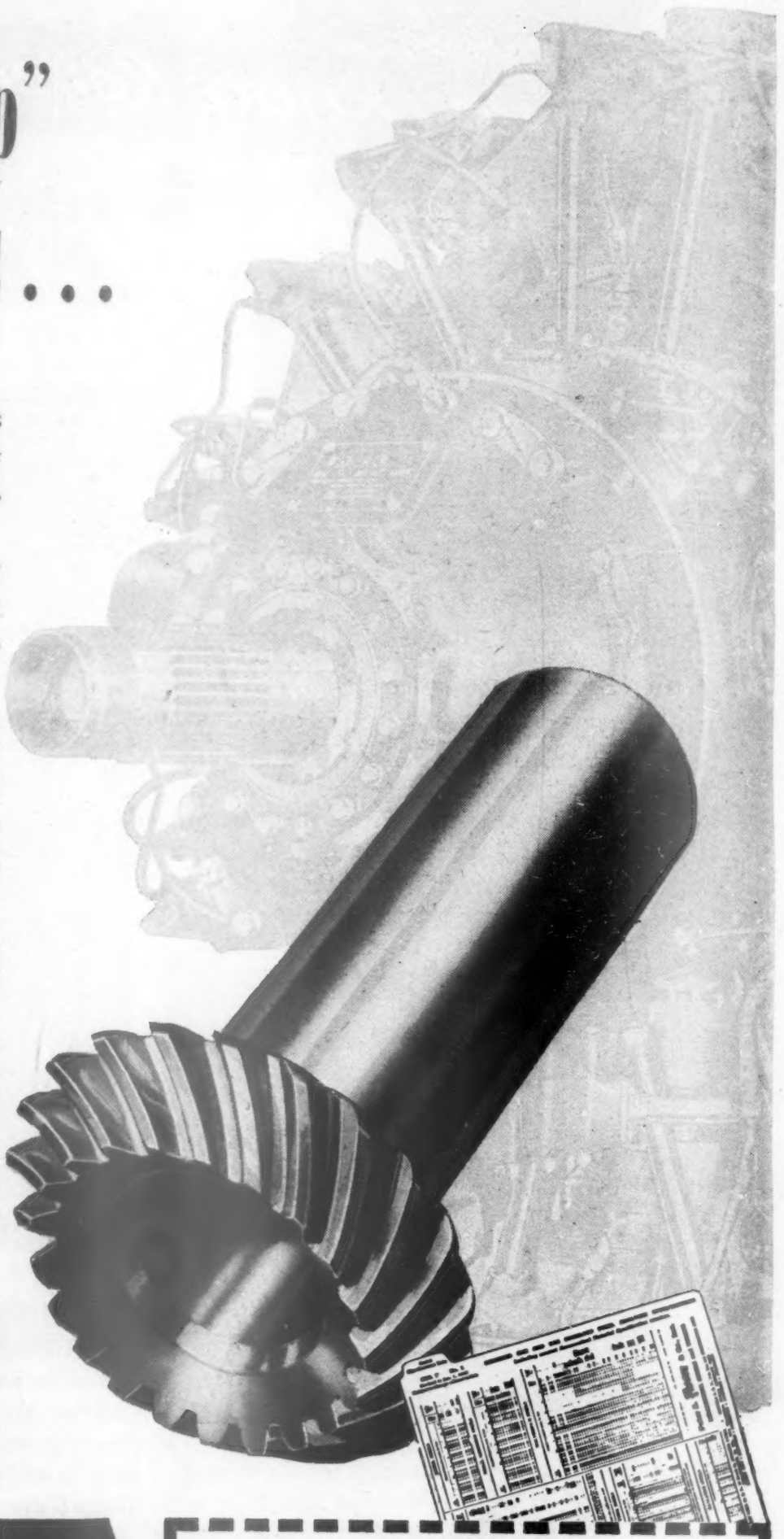
Third, Janitrol Unit Heaters are easily added or relocated without expensive remodeling of central heating system or interruption to plant operation.

When you decide on unit heaters, remember this: no other unit heater has *all* the engineered advantages of Janitrol. So no other unit heater can quite equal the performance and economy Janitrol assures hundreds of satisfied users. Write for descriptive data on the complete Janitrol line. Surface Combustion Corporation, Toledo 1, Ohio.

Janitrol GAS-FIRED UNIT HEATERS


Unit Heater Blower Type
Unit Heater Propeller Type
Unit Heater Heavy Duty Floor Type
Floor Type Blower Unit
Duct-Type Unit Heater

It Says "Giddap" to 2500 Horses...



THIS gear is used in an inertia starter. It has to kick over a heavy aircraft engine until the pistons go to work. For this grueling application, alloy steel is a must.

Note the machining required. Then multiply it by a production quantity. As with every production application, machinability becomes a must, too.

That's why Frasse stocks 11 medium-carbon alloy steels in only one condition—*annealed.* You've alloy properties galore to choose from when you work from Frasse stocks. But no matter what the analysis, it has been treated for faster, easier machinability, and for uniform structure.

There's no fear of non-uniformity when you use Frasse alloys. You get the same machinable structure with every order. Standardize, for warehouse alloy steels, on Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N.Y. (Washington 2000) • Jersey City • Syracuse • Hartford Rochester • Baltimore

FRASSE

for Alloy Steels

A 3135	X 4340	A 6150
A 3140	A 4615	A 8620
X 4130	A 6145	A 8740
A 4150		A 8742

GET THIS HANDY ALLOY CHECK CHART

New Frasse check chart lists heat treat procedures for 60 popular alloy steels. Includes temperatures for hardening, annealing, normalizing, carburizing. Also covers cooling media and tempering ranges. Send the coupon for your free copy today.

Peter A. Frasse and Co., Inc.
17 Grand Street, New York 13, N. Y. 48N

Please send me a free copy of your alloy heat treatment check chart, Section D, No. 3.

Name:.....

Firm:.....

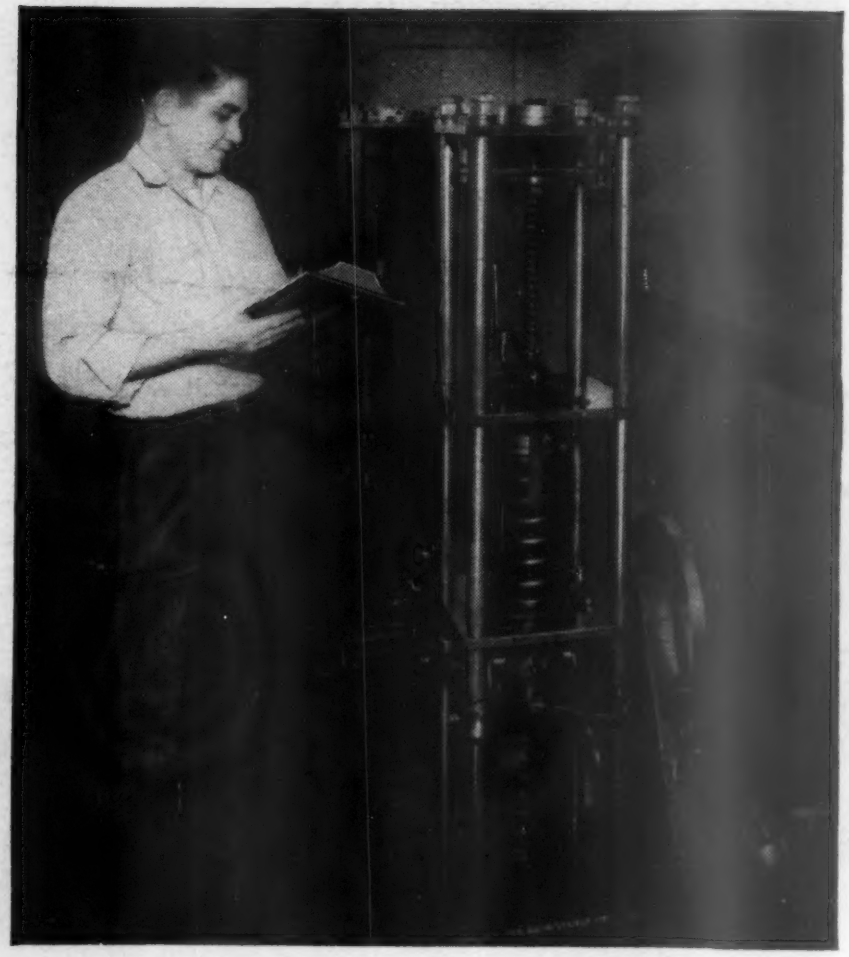
Address:.....

Small Cam-Operated

do you know Roller Chain...

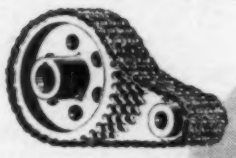
is actually elastic!

1 AND HERE'S WHAT that means to you. Where your equipment is subjected to momentary overloads and sudden strains, the inherent elasticity of roller chain will help absorb those damaging shocks and protect your equipment.



2 WE'VE ACTUALLY PROVED that roller chain is elastic. With this testing machine, designed and built by our engineers, we stretch this small section of Baldwin-Rex Roller Chain about ⅛-inch with each load application. We do this more than 10,000,000 times. Each time the chain must withstand the load and retract to its original length in order to meet our rigid specifications.

3 TAKE THIS CALENDER DRIVE. The elasticity of that Baldwin-Rex Chain enabled it to withstand the severe shock loads as lumps of crude rubber are squeezed through the rolls. It's been in service more than 30,000 work hours and is still going strong. Previous drives gave only 6 months' service. That's real proof!



You can simplify replacement, cut costs and help speed deliveries by specifying standard roller chain. Your Baldwin-Rex man will be glad to give you all the facts and help you with your application problems. Call him or write us direct.

BALDWIN·REX

ROLLER CHAINS

BALDWIN-DUCKWORTH DIVISION OF CHAIN BELT COMPANY

327 Plainfield Street, Springfield 2, Massachusetts

Small Cam-Operated
DRUM SWITCHES

SIZE 00 - ¾ hp
SIZE 0 - 2 hp
SIZE 1 - 5 hp

for Multi-Speed Motor Control Reversing Service Master or Transfer Switching

An 8-page bulletin is required to describe the great variety of applications and switching combinations of these handy Bulletin 353 cam-operated drum switches. They can be built up to 15 sections, with contacts opening or closing at any point of lever travel. Switching problems can be solved with surprising ease and simplicity. The silver alloy contacts require no cleaning or servicing, because any oxide which may form on the contacts is as good a conductor as the contact metal, itself. There are no sliding contacts . . . the beryllium copper fingers operate with a quick-closing and quick-opening action. Available in three sizes shown above.

Sectional view of Bulletin 353 Drum Switch showing contact sections and central operating shaft with hand lever.

ALLEN-BRADLEY

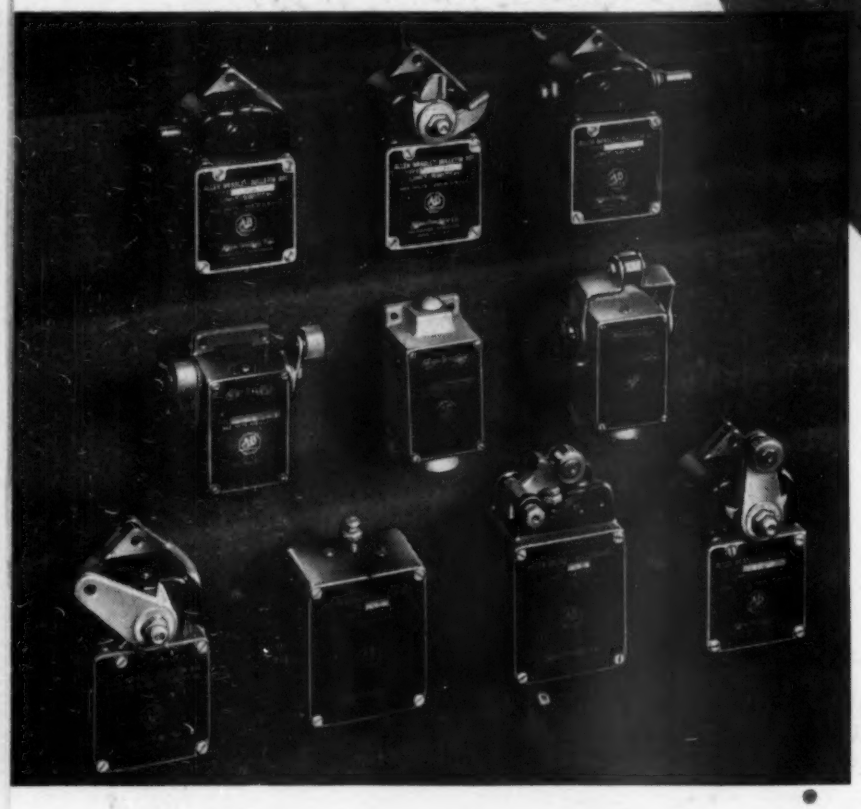
MOTOR CONTROL

PUSH BUTTONS
LIMIT SWITCHES

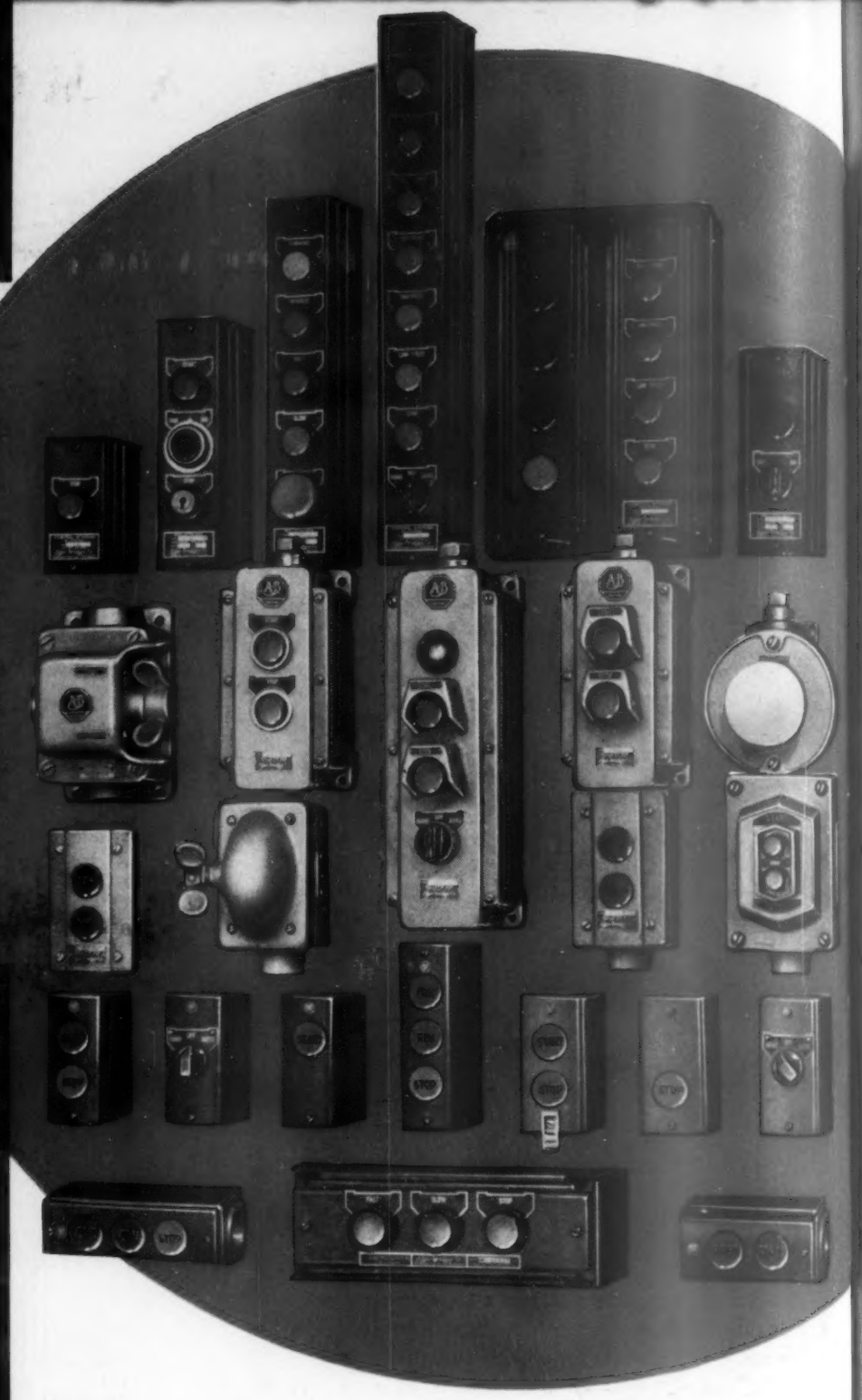
for

Manual and Automatic Control

If you are designing machines . . . or installing new machines . . . get the most out of them with push buttons or limit switches of the correct type. Added safety can be assured by using extra STOP buttons or perhaps a limit switch. Convenience, speed, and less spoilage are a few other advantages of adequate use of modern pilot control stations.



Limit switches are more than "stop-motion" units . . . they regulate machine speeds during bed travel or automatically put machines through a repeated sequence of operations. Send for Bulletin 801-802 on Allen-Bradley standard, heavy duty, and precision limit switches.



The above illustration shows 25 of the several hundred types of standard push button stations that are listed in Allen-Bradley Bulletin 800. But these few examples will serve to indicate the immense variety of enclosures, button labels, numbers of buttons, and also such auxiliary elements as pilot lights, selector switches, etc., which can be selected from the standard Allen-Bradley line to fit your needs. If you build or use motorized machines, by all means send for Bulletin 800, today.

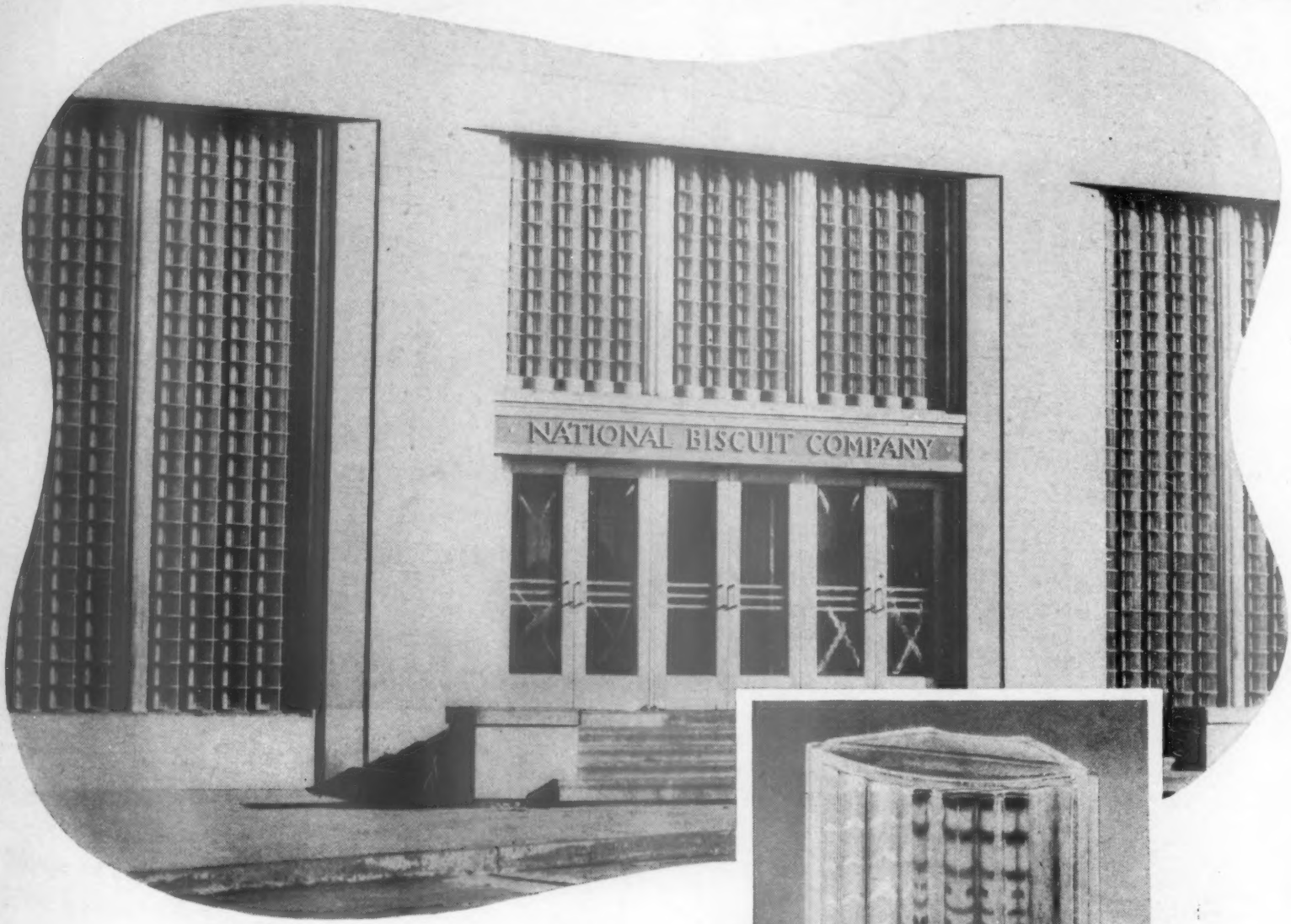
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

A-B Quality

ALLEN-BRADLEY

MOTOR CONTROL

THE MARK OF A MODERN BUILDING



It's not surprising that PC Glass Blocks should be regarded by many people today as the mark of a modern building. These blocks are so modern, in both appearance and function, that any building which includes them just naturally seems modern, too.

PC Glass Blocks are widely used in modern industrial buildings largely for one reason: they do so many things so well.

They add to the appearance of any structure . . . because they form bright, neat translucent panels very appealing to the eye.

They transmit daylight generously into building interiors, and can even direct the daylight to where it is most needed.

Their excellent insulating properties mean greatly reduced heat loss through light areas, and consequent savings in heating and air conditioning costs. They prevent infiltration of dust and dirt, deaden outside sound, clean easily. They can be combined with transparent glass sash construction. And they harmonize perfectly with any architectural style.

When you are considering new construction or modernizing old buildings, you can use PC Glass Blocks with confidence. They're the mark of a modern building. Send in the convenient coupon for complete information on PC Glass Blocks. Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pennsylvania.

• Also makers of PC Foamglas •

PC GLASS BLOCKS

Pittsburgh Corning Corporation
Room 649, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send along my free copy of your new book on the use of PC Glass Blocks for Industrial Buildings. It is understood that I incur no obligation.

Name_____

Address_____

City_____ State_____

PITTSBURGH PC CORNING

T. M. REG. U.S. PAT. OFF.

FOR ADDITIONAL INFORMATION SEE OUR INSERTS IN SWEET'S CATALOGS

GLASS BLOCKS

Distributed by PITTSBURGH PLATE GLASS COMPANY
by W. P. Fuller & Co. on the Pacific Coast and
by Hobbs Glass Ltd. in Canada

APPLICATION FOR EMPLOYMENT

NAME

ADDRESS

Rototrol

Modern industry everywhere

QUALIFICATIONS

REGULATES VOLTAGE and current of electrical machines to maintain a selected or changing value, with forcing action for quick response.

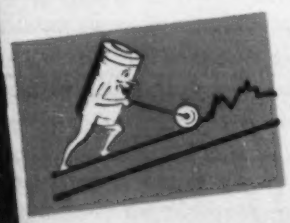
CONTROLS SPEED of d-c motors accurately over a wide range—*matches speed* of one drive with another—or holds speed constant regardless of load variations.

MAINTAINS CONSTANT TENSION or constant torque on a wide variety of roll, reel, draw, hoist, and similar applications with improved performance and greater selective range.

LIMITS LOADS on electrical and mechanical equipment to predetermined values, for protection against excessive peaks or unsafe stresses.

INCREASES ACCELERATION and deceleration rates of high inertia loads, and gives smoother performance without current peaks.

POSITIONS accurately mechanical equipment, devices or materials, such as machine tools, tracer mechanisms, alignment stands, ship steering rudder, etc.



REGULATES POWER FACTOR of synchronous machines and power input of furnaces, welding heads and similar equipment to create better system load factor and efficiency.

EMPLOY ROTOTROL

for dependable, fully automatic control of any process or operation requiring precise regulation.

NATURE OF CURRENT EMPLOYMENT

PAPER MILL: Applied to paper machine as speed regulator, Rototrol has increased production 30% and materially reduced maintenance and repair on the machine.

STEEL MILL: Applied to a cold strip mill reel as a tension regulator, Rototrol increases production, reduces strip breakage and assures uniform coil.

ORE MINE: Applied to mine hoist drive for speed control and current limiting, Rototrol permits more trips per hour with less electrical and mechanical stress, lower maintenance.

For the complete story on Rototrol, ask for Booklet B-3649. Call your local Westinghouse office or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

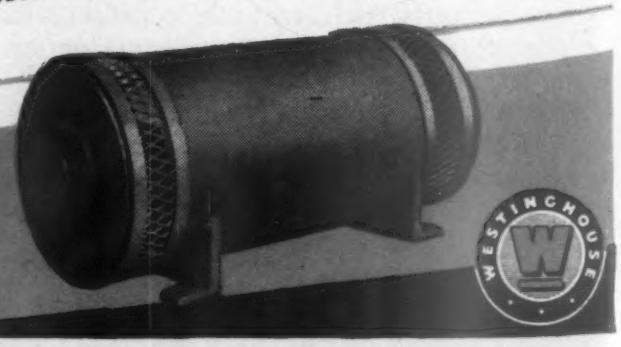
J-21433

SIGNATURE AND PHOTO

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

ROTOTROL



RUST-OLEUM STOPS RUST...

WHERE ORDINARY PROTECTION FAILS

IT'S USED BY INDUSTRY IN A THOUSAND WAYS!

Indoors or out—Rust-Oleum is a positive money-saver. IT STOPS RUST . . . and adds years of life to metal roofs, structural steel, machinery, equipment, etc. Actual tests reveal that Rust-Oleum outlasts ordinary protective materials two to ten times, according to conditions. Applied to iron and steel — *even where rust has already started*—Rust-Oleum spreads a tough weatherproof coating with high resistance to all destructive conditions — particularly rain, snow, dampness, heat fumes and sulphur-laden smoke. Modernize your maintenance program by specifying Rust-Oleum—*it costs less per year for top protection.*

HERE'S ANOTHER PROVED METHOD OF STOPPING RUST

"R-9" is a temporary protective coating intended to be removed. It is clean to work with . . . quickly applied. Dries in less than 72 hours. Does not smudge or rub off on hands or clothing. "R-9" provides practical, low-cost protection. Ordinary solvents remove it easily.

Write for new descriptive folder.

HOW RUST-OLEUM CUTS LABOR COSTS

● **LESS PREPARATION**—No sandblasting or "dissolving chemicals" are necessary. Simply wirebrush to remove rust scale and blister. Then apply right over the remaining rust. Dip, brush or spray!

● **FASTER APPLICATION**—Rust-Oleum can be applied 25% faster . . . and covers more area per gallon.

● **LASTING PROTECTION**—Rust-Oleum prolongs the interval of applications — at a proportionate saving in labor and materials.

Ask your distributor or write today for catalog of recommended applications — Also, ask about "R-9".

YOU WILL BE GLAD YOU MAILED THIS COUPON TODAY!

RUST-OLEUM CORPORATION

2437 Oakton Street • Evanston, Illinois

Gentlemen: Please send us a free copy of the new Rust-Oleum Catalog showing color selection and recommended uses.

*Name*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

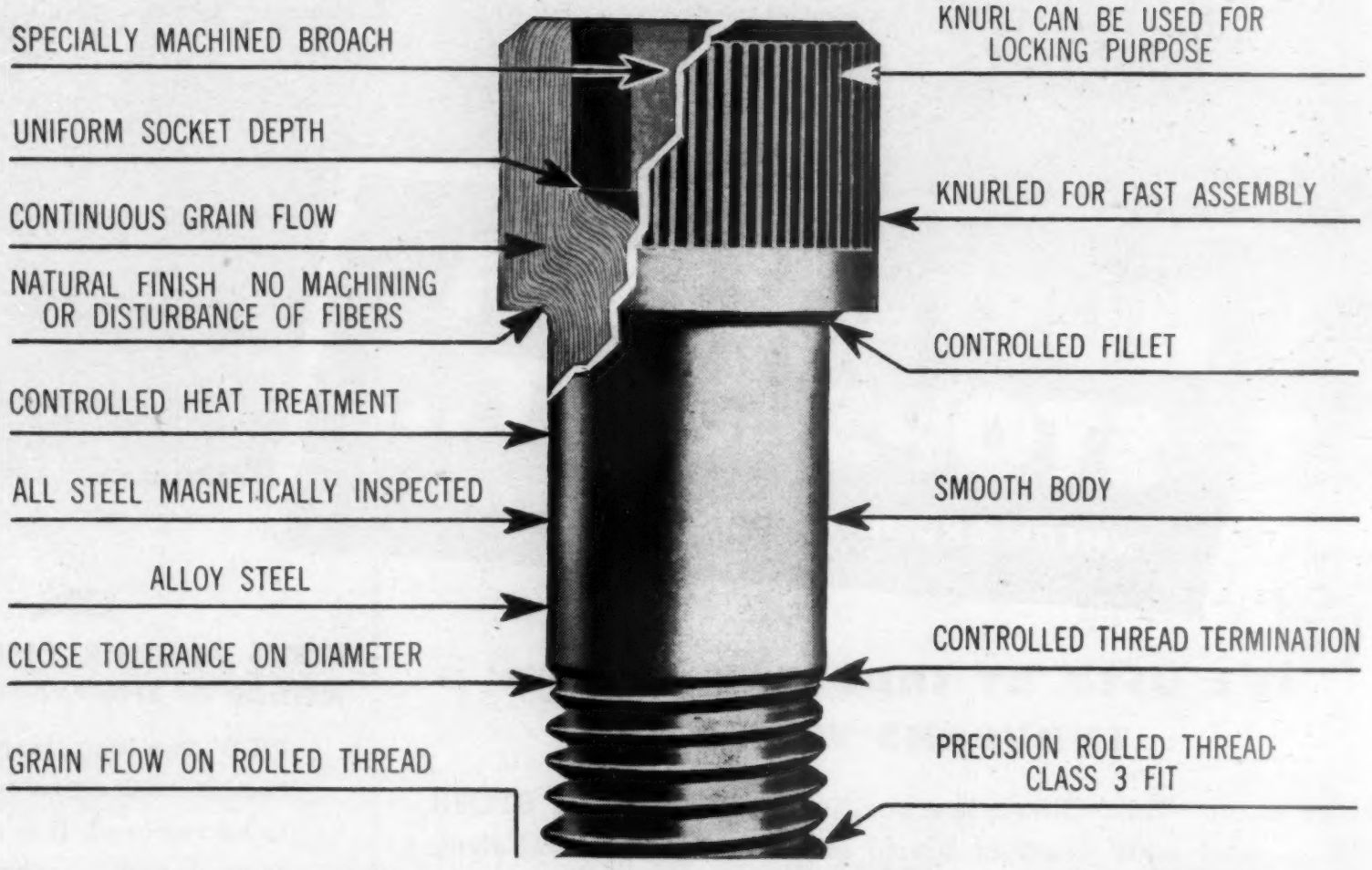
( ) Also send Folder on "R-9"

These IMPORTANT FEATURES *of*

UNBRAKO

REG. U. S. PAT. OFF.

KNURLED SOCKET HEAD CAP SCREWS

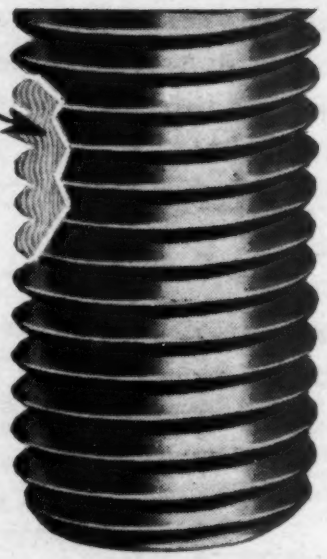


Give you these OUTSTANDING ADVANTAGES

STRENGTH, TOUGHNESS, RELIABILITY . . . the result of constant testing, inspection and quality control.

KNURLED HEAD FOR EASY ASSEMBLY . . . the knurled head provides a slip- and fumble-proof grip, even for the most oily fingers, therefore, the screw can be screwed-in faster and farther before it becomes necessary to use a wrench.

We also make the famous "Unbrako" Socket Set Screw with the "Self-Locking" Knurled Cup Point, and the "Unbrako" Socket Set Screw with the "Self-Locking" Knurled Threads.



OVER 44 YEARS IN BUSINESS

EASY START THREAD POINT . . . specially designed to assure fast, easy thread start.

INTERNAL WRENCHING . . . to promote Compact Designs which save space, material, weight and costs. Write for your copy of the "Unbrako" Catalog.

"Unbrako" and "Hallowell" Products are sold entirely through distributors.

Knurling of Socket Screws originated with "Unbrako" in 1934.

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 546 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

Eliminate DAMAGING WATER and OIL from Your Compressed Air Lines

With

ADAMS AFTERCOOLERS and CYCLONE SEPARATORS

Air Cooled to Within 10 DEGREES of Cooling Water! EASILY INSTALLED! Pipeline Construction

ADAMS equipment insures a constant supply of cool, moisture-free, oil-free air to power your compressed air tools with the highest efficiency and safety . . . at the *lowest* installation and maintenance cost.

ADAMS AFTERCOOLERS are *guaranteed* to cool air to *within 10 degrees* of your cooling water. This means *extra* thoroughness in condensing water and oil vapors from your compressed air.

NO FOUNDATION or other facilities are required for installation. The Adams "pipeline" construction permits the After cooler and Cyclone Separator to fit right into a section of the pipe line . . . either vertically or horizontally!

CYCLONIC SEPARATION is the Adams principle . . . engineers agree that it is *far more efficient* than other mechanical separation!

WRITE!

today for full engineering data on improved pneumatic power performance. Ask for Bulletin 703.

R. P. ADAMS CO., INC.

215 East Park Drive **Buffalo 17, N. Y.**

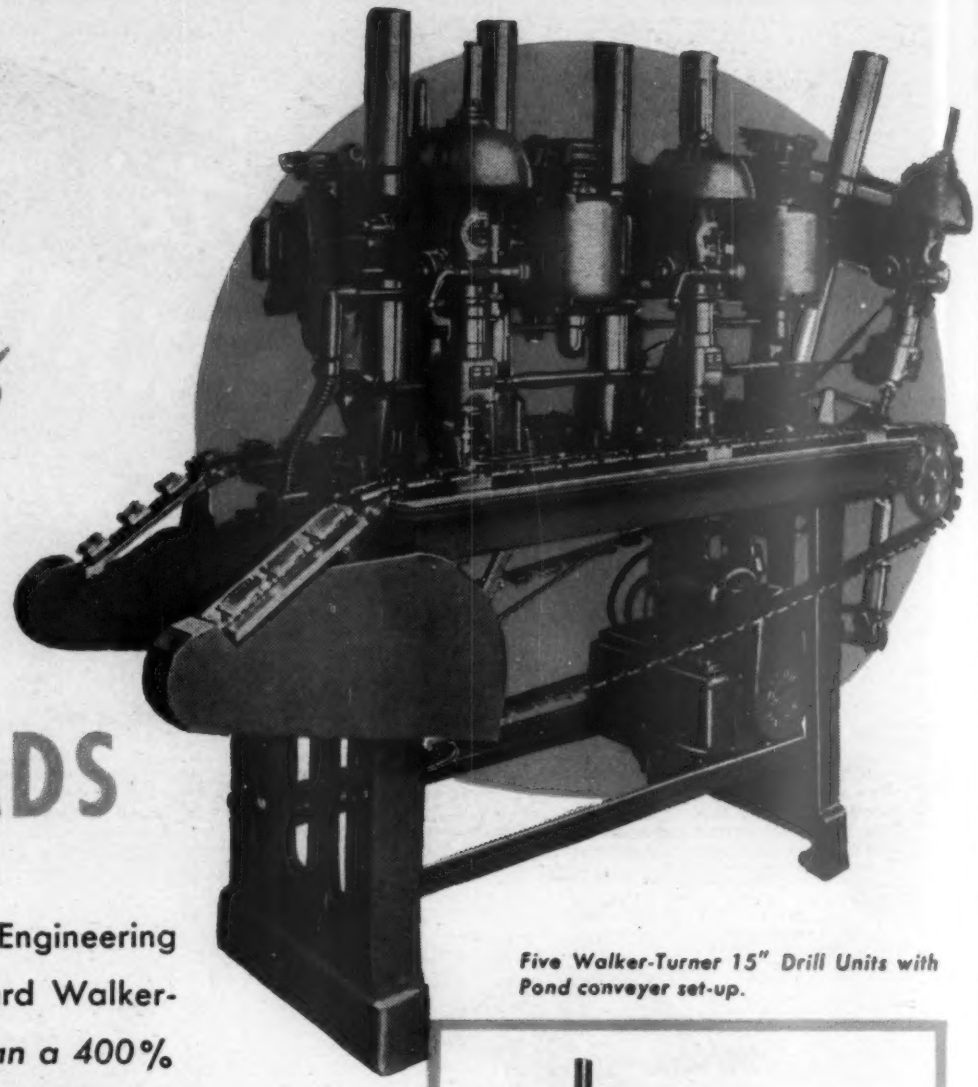
ADAMS AFTERCOOLERS and CYCLONE SEPARATORS

TAPPING PRODUCTION

Increased 400%

WITH STANDARD WALKER-TURNER

15" DRILL HEADS

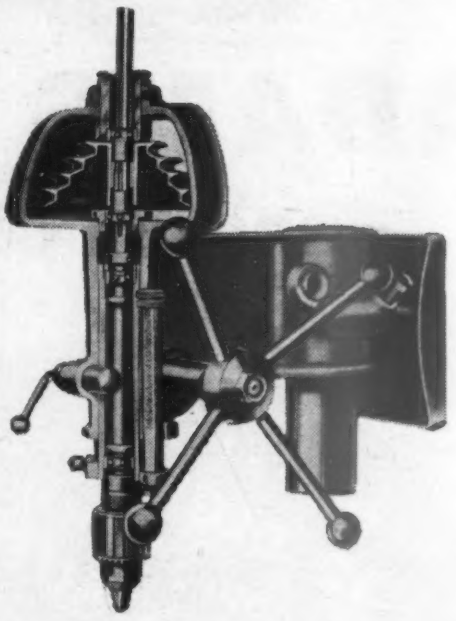


Five Walker-Turner 15" Drill Units with Pond conveyer set-up.

This set-up for tapping, designed by Pond Engineering Co., Springfield, Mass., and using standard Walker-Turner 15" Drill Heads showed "*better than a 400% increase in production over conventional methods.*"

Two pieces are handled simultaneously, one having three holes to be tapped, the other two. The operator places the pieces on the conveyer plates. The Pond Conveyer and the Walker-Turner Drill Presses do the rest automatically, and finished pieces drip into containers at the other end.

Walker-Turner Heads were chosen for this set-up because the Pond engineers wanted a light-weight, compact unit with extreme flexibility as to mounting, speeds and control. The unique design, rugged construction and low investment cost were other factors in the decision.



No. 9D13X, 15" DRILL HEAD

6 spline spindle, 4 bearing, 4¼" spindle travel, speeds with 1740 r.p.m. motor 600 to 5000 r.p.m.

***Price less motor and column $42.50**

TWENTY-FIFTH YEAR
1922 1947

***F.O.B. Plainfield—**
Slightly higher west of the Rockies and in Canada

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walker-Turner COMPANY, INC. PLAINFIELD, N.J. U.S.A.

MACHINE TOOLS

DRILL PRESSES—HAND AND POWER FEED • RADIAL DRILLS • RADIAL SAWS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
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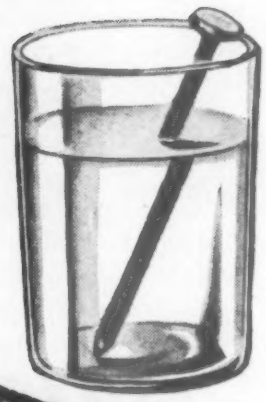
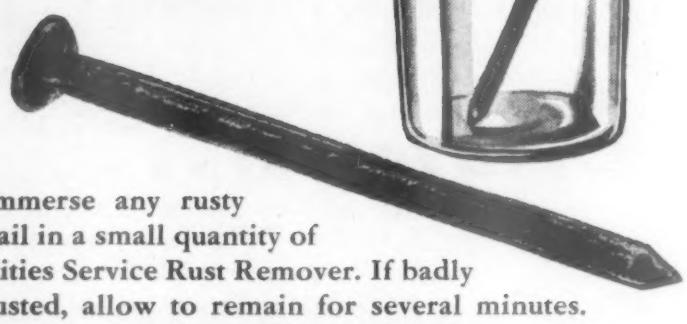
What to do about Rust?

Make this Test





Immerse any rusty nail in a small quantity of Cities Service Rust Remover. If badly rusted, allow to remain for several minutes. You can actually see the rust dissolve.

See the Results

Remove nail and wipe dry with cloth or tissue. Note the complete absence of rust and the way the original surface reappears.

Cities Service Rust Remover has been tested for four years throughout a small, highly industrialized area in the East, where it has earned a unique reputation for performance. RUST REMOVER is a clean, clear liquid, practically odorless, non-inflammable, easily applied, and harmless to handle by those not allergic to specific chemicals. It is fast-acting, and, although heating somewhat accelerates results, general application is recommended at normal temperature (60°-90°F.). RUST REMOVER is effective on chromium, copper, aluminum, steel and iron.

Send a Free Demonstration of Rust Remover on Your Own Equipment

(Available only in Cities Service marketing territories EAST of the Rockies.)

Cities Service means Great Service

5 Big Advantages

1. Non-inflammable
2. Harmless to Normal Skin
3. Makes Metals Chemically Clean
4. Removes Rust by Chemical Action
5. Free from Muriatic, Sulphuric, Nitric and Oxalic Acids or Cyanide

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FUSETRONS

Hold Harmless Overloads– Prevent Needless Shutdowns

Many Companies Have Proven It...

For Example–

"Formerly we were troubled by two kinds of needless fuse blowings in our milling machine department. Frequently the operators take too deep a cut in the material on which they are working, building up a momentary overload. Ordinary fuses blew so frequently on this type of overload that it was necessary to install oversize fuses, robbing the circuit of proper protection.

"Our other difficulty came when several machines would start operating simultaneously after rest periods or the lunch hour, blowing the fuses in the main switch, thus shutting down all the machines of the department.

"In June, 1945, Mr. Edward Lambert, our Chief Electrician, solved both difficulties by installing 20 ampere 250 volt Fusetrons in the 30 ampere switches on the individual machines and 200 ampere 250 volt Fusetrons in the main switch. He reports that no outages have occurred since that was done."

Lloyd B. Benham, V. P.
PORTER CABLE MACHINE CO.
Syracuse, New York

BUSS

Keep Electrical Equipment Operating Without Sacrificing Protection

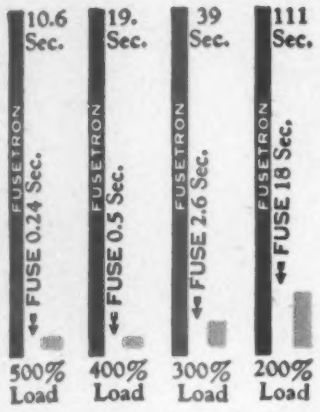


Chart shows 30 ampere 250 volt fuses. Other sizes and 600 volt ratings show similar results.

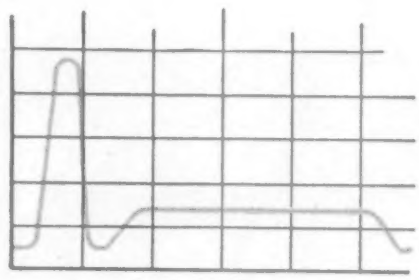
Buss Fusetrons have tremendous time-lag. They *can* hold harmless overloads, yet provide protection against dangerous overloads or short-circuits because they combine a fuse with a thermal cutout.

Here's how the time-lag of Fusetrons compares with that of ordinary fuses:

It is readily seen from this chart why Fusetrons hold harmless overloads and keep circuits operating instead of opening and causing useless shutdowns. Ordinary fuses and other protective devices cannot do this job.

Here's how Fusetron time-lag will work for you. AC motors require a current of 3 to 9 times their rating for starting. This surge of current often causes ordinary fuses to open.

Fusetrons have the capacity to absorb this high starting current without opening, even when the type of load causes starting current to hang on for limited periods.



In normal operation overloads often occur that are heavy but short lived—or light overloads hang on. In either instance they are harmless—yet they may cause ordinary fuses to open.

Fusetrons hold such harmless overloads—and keep circuits in operation.

Fusetrons Also Prevent Needless Blows on Mains and Feeder Circuits

Even when all motors on a circuit start at one time, Fusetrons will not open. For example: four 15 ampere motors on a circuit would ordinarily be protected by 90 ampere fuses. If these 4 motors start at one time the combined starting current is approximately 360 amperes. At this load a 90 ampere fuse would open in about 3 seconds—before the motors could start—BUT A 90 AMPERE FUSETRON WILL HOLD 24 SECONDS, ample time for all motors to start.

So, with Fusetrons installed in the mains, feeders and all branch circuits, shutdowns caused by needless opening of fuses or other forms of protective devices on harmless overloads are entirely wiped out.

Fusetrons Give Many Other Kinds of Protection Heretofore Not Available

Fusetrons do everything fuses do, as is confirmed by the Underwriters' Laboratories' Label, and in addition . . .

★ Provide simplest way to stop burnouts from single phasing. ★ Make burnout protection of SMALL motors simple and inexpensive. ★ Give thermal protection to panelboards and switches. ★ Prevent needless blows caused by heating in panels and switches. ★ Permit use of larger motor or adding more motors on circuit without installing larger switch or panel. ★ On new installations, proper size switches and panels can be used instead of oversize. ★ Protect motors against burnout. ★ Give double burnout protection to large motors. ★ Protect coils, transformers and solenoids against burnout.

What is a FUSETRON?

The Fusetron is a DUAL element device—a Fuse to which is added a Thermal cutout.

The result is a fuse with tremendous time-lag and much less electrical resistance.

Fusetrons have the same degree of Underwriters' Laboratory approval for both motor-running and circuit protection as the most expensive devices made.

Made to the same dimensions as ordinary fuses, Fusetrons fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere in both 250 and 600 volt types. Also in tamper-resisting type (Fustats) for 125 volt circuits.

Their cost is surprisingly low.

Get All The Facts—Get Better Protection Send The Coupon Now

Only one shutdown, or one lost motor or one destroyed panel may cost you far more than replacing every fuse with a Fusetron.

Don't risk such losses—protect your production schedules by changing your entire electrical system to FUSETRONS.

BUSSMANN MFG. COMPANY, University at Jefferson
St. Louis 7, Mo.
(Division McGraw Electric Co.)

FUSETRONS

SOLD THROUGH WHOLESALERS

BUSSMANN MFG. CO., University at Jefferson
St. Louis 7, Mo. (Division McGraw Electric Co.)

Please send me complete facts about BUSS Fusetrons.

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lighting with a new versatility of application . . . ceilings unlimited

You get "good lighting" from MILLER FLUORESCENT TROFFER LIGHTING SYSTEMS — you get, in addition, the opportunity to plan the lighting to form any ceiling pattern desired — CEILINGS UNLIMITED! Interiors of stores, schools, offices, factories, and public buildings are thereby modernized as well as lighted by the use of this one basic lighting system. Installation is simplified. Wiring costs are cut up to 50%, conduit and conduit fitting costs up to 80%. Supports from structural ceiling reduced 50 to 75%.

Miller lighting service, developed over 103 years' pioneering in good lighting, is all-inclusive. Its 50 and 100 FOOT CANDLERS (Continuous Wireway Fluorescent Lighting Systems) have been established as standard for general factory lighting. Miller also makes Incandescent and Mercury reflector equipment for factory and commercial application.

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A MESSAGE TO MANAGEMENT ABOUT ECONOMY

REQUIRE ONLY
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FOR SMOOTH,
VIBRATION-FREE OPERATION

SULLIVAN

NEW "UNITAIR" WL-80 COMPRESSORS OPERATE MORE ECONOMICALLY

Extremely compact, efficient two stage, air cooled compressors available in nine sizes from 15 to 100 H.P.—81 to 590 C.F.M.

Consult a Joy Engineer or write for Bulletin A-56

A compressor for every standard electric motor rating. More air per motor horsepower because each compressor is matched with a standard motor rating from 15 to 100 H. P. Built-in oil cooler for greater economy. Direct-concentric valves for highest efficiency.

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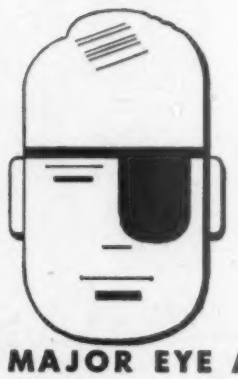


COST OF ONE MAJOR EYE ACCIDENT

1.50

AVERAGE COST OF ONE PAIR SAFETY GOGGLES

$326.50 . . . . . SAVED

BY PREVENTING 1 EYE ACCIDENT

Above is the simple arithmetic of what one major eye accident involves—and the relatively *infinitesimal* cost of the means to prevent it. Some authorities put the direct cost of major eye accidents even higher—at $351 and estimate the hidden or indirect expense as *4 times as much* in terms of idle machines, lowered production, cost of time lost by injured employee, foremen and others and additional factors. Why risk even one eye accident that can add to today's burden of pyramided costs? 98% of eye accidents can be prevented by the use of safety goggles, according to the Society for the Prevention of Blindness. Your AO Safety Representative has complete facts and figures which prove that adequate eye protection can lower *your* costs.

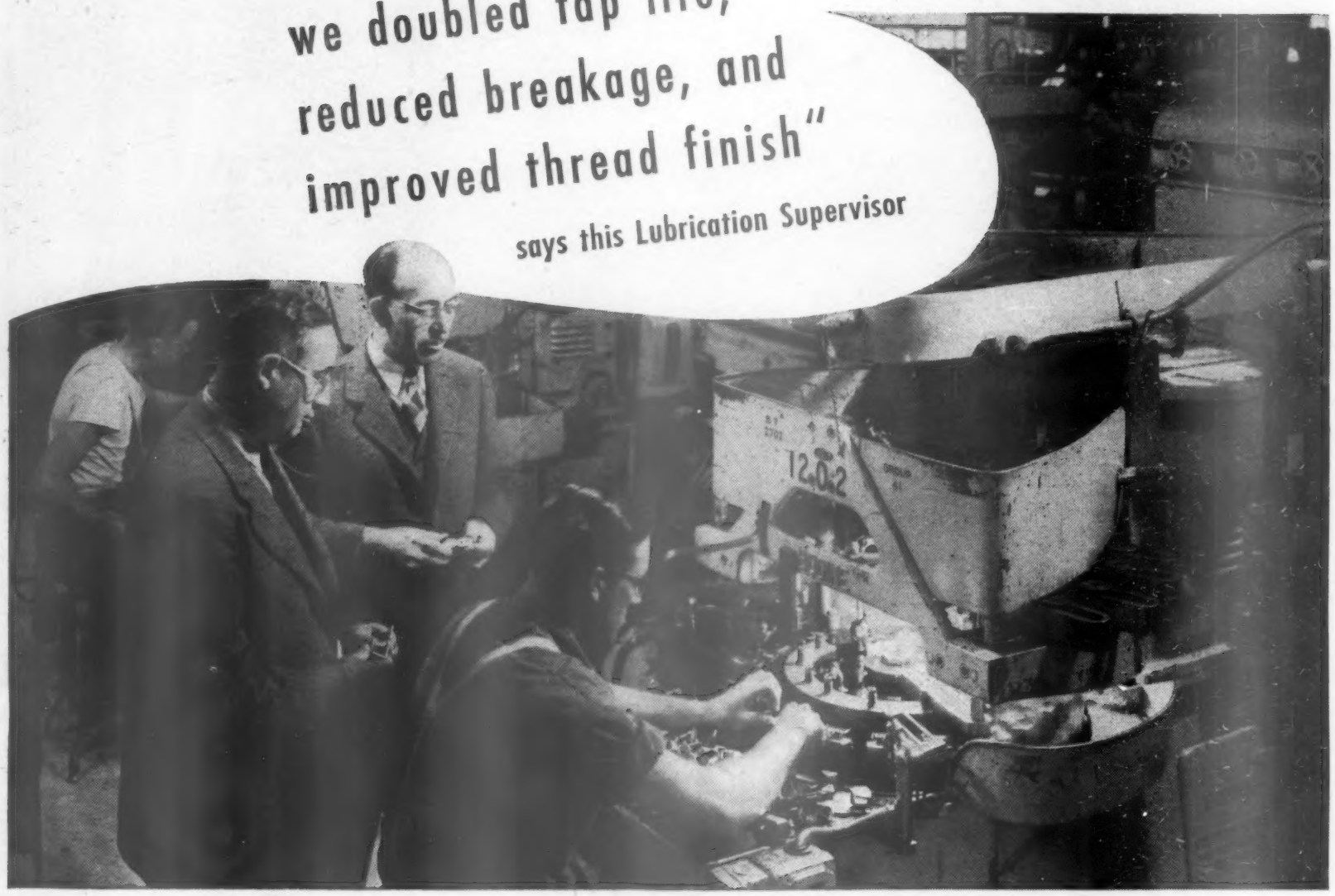
American Optical COMPANY
Safety Division

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL INDUSTRIAL CITIES

"with GULF L. S. CUTTING BASE

we doubled tap life, reduced breakage, and improved thread finish"

says this Lubrication Supervisor



The Lubrication Supervisor consults with a Gulf Lubrication Engineer (left) on results with Gulf L. S. Cutting Base A in tapping cold rolled iron magnet yokes for business machines.

"WE make careful performance studies to insure that the cutting oil used for each particular job is the best we can select for that job," says this Lubrication Supervisor. "This policy has paid us big dividends in greater machining efficiency. When we switched to Gulf L.S. Cutting Base for tapping magnet yokes, for example, we increased tap life 100 per cent, reduced tap breakage, and improved thread finish."

Every Gulf Cutting Oil has specific properties which insure better performance on certain types of jobs! Call in a Gulf Lubrication Engineer today and let him show you how they can help you improve your machining practice. Write, wire, or phone your nearest Gulf office.

Gulf Quality Cutting Oils

Gulf Lasupar Cutting Oils A, B, and C
Gulf Electro Cutting Oils A, B, and C
Gulf M-L Cutting Oils A, B, and C
Gulf Cut-Aid
Gulf Cutx B
Gulf L. S. Cutting Base A and B
Gulf Soluble Cutting Oil A

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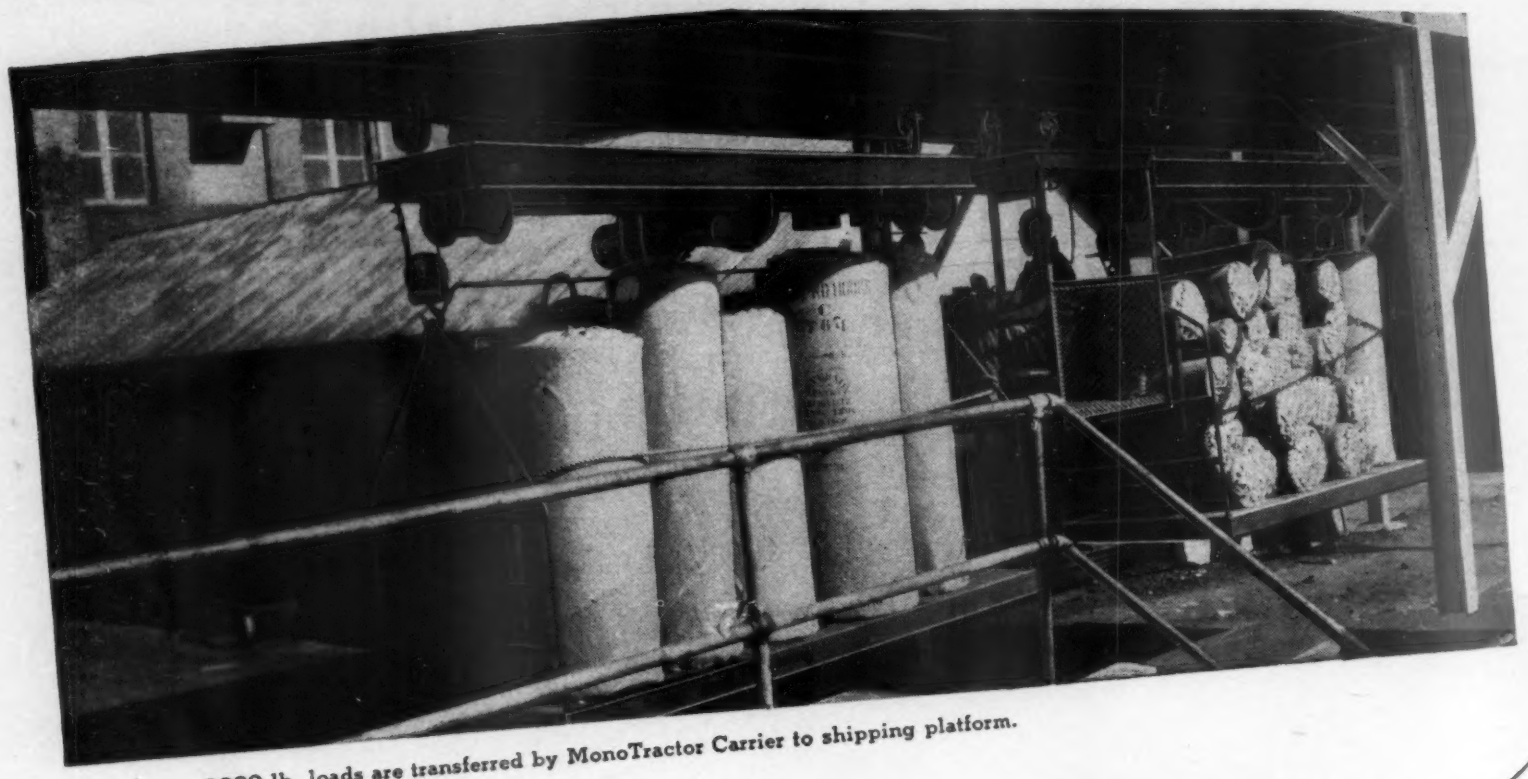
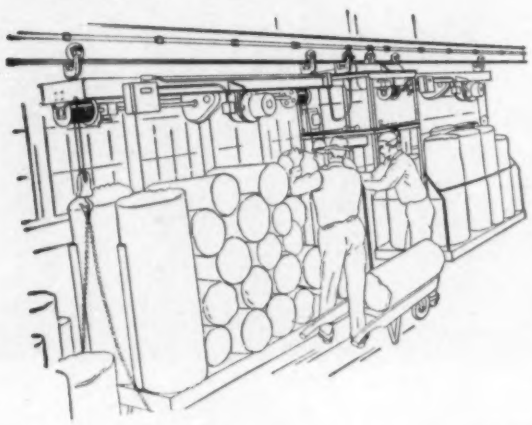
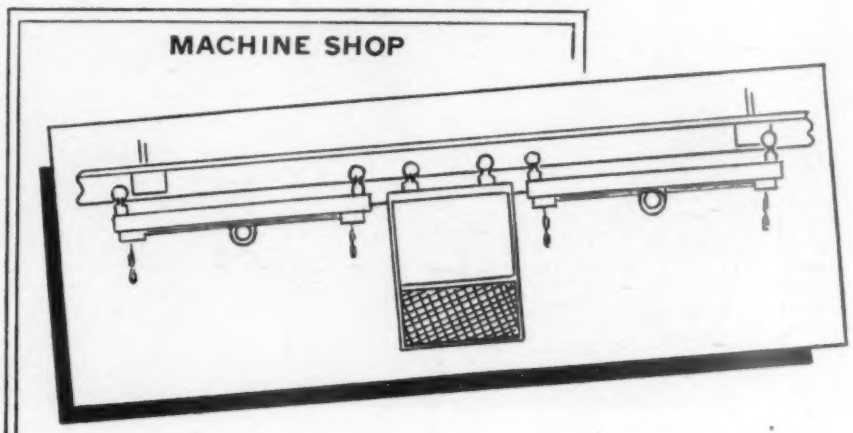


SHIPPING PLATFORM

3000 lb. loads are transferred by MonoTractor Carrier to shipping platform.

Floor trucks are lifted by hoists on MonoTractor Carrier.





CLOTH ROOM

Overhead Transportation with MonoTractor Drive

There are very few limitations connected with American MonoRail Overhead Handling. This installation presented at least two problems — low head room and transfer of heavy materials over large areas and from building to building. The problems were solved by American MonoRail Engineers. The equipment consists of RailMaster Shielded Track, two twin hook hoists, with cab control, propelled by an American MonoTractor.

In operation just a short time, handling costs have already shown a very substantial saving. Production has increased and manpower formerly used in lifting and hauling materials from one operation to another has been converted to more productive output.

Let an American MonoRail Engineer show you how to cut your overhead with overhead handling. This service is given without obligation.

SEND FOR BULLETIN C-1

A 56-page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

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CLEVELAND 7, OHIO

"Cold-Laid Mastic is an All-Round Utility Floor"

Why do we make this claim?

Because Industrial Asphalt Mastic Floors made with Flintkote Flooring Emulsions can be laid quickly . . . over concrete, wood, steel, brick, or any other firm base.

Workers like mastic because it forms a warm, comfortable, resilient working surface... because its shock-absorbing and sound-deadening qualities make any plant a more quiet, more pleasant place to work.

They're equally efficient either for new construction or for resurfacing... for large areas or small... may be placed by hand troweling or power float method.

These are a few reasons why we recommend Industrial Asphalt Mastic Floors made with Flintkote Flooring Emulsions for almost *any* industrial flooring requirement. Write for specifications today.

Flintkote Flooring Emulsions give you a tough, durable, heavy-duty industrial mastic floor with high traction value wet or dry. And one that can resist the heaviest traffic.

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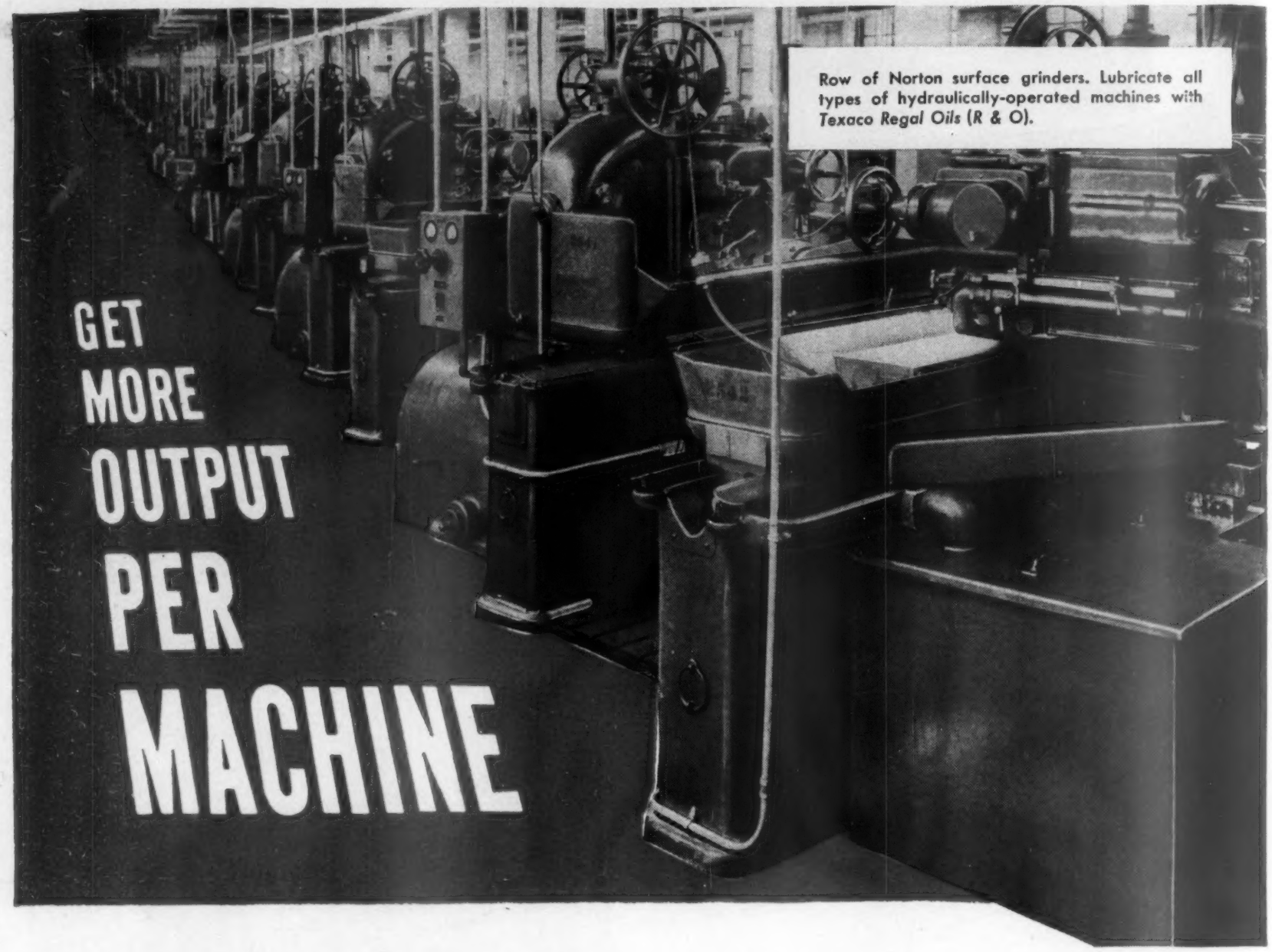
FLINTKOTE

Products for Industry



Row of Norton surface grinders. Lubricate all types of hydraulically-operated machines with *Texaco Regal Oils* (*R & O*).

with effective lubrication

To keep machines producing at full capacity . . . means using the *right* lubricant *right* . . . on every job . . . *Texaco.*

In hydraulically-operated machines, for example, you'll get smoother and more efficient operation with *Texaco Regal Oils* (*R & O*). The ability of these world-famous oils to prevent rust, sludge and foam make them ideal for hydraulic systems. They assure much longer production periods without shutdown to change oil.

Texaco Regal Oils (*R & O*) are also widely used for turbine lubrication—your best assurance of dependable power production.

Texaco has other lubricants to help you get greater production at lower cost . . . and Texaco Lubrication Engineering Service will gladly assist in their proper selection and use. Just call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO Lubricants, Fuels and Lubrication Engineering Service

Tune in... TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

YOUR CHANCES OF GETTING AHEAD

FOR 20 years we have been whittling away the foundations of our economic structure. We have been cutting away the incentives to "get ahead in the world," to increase production and to improve efficiency. Unless this process is reversed soon, we risk the sort of industrial stagnation that currently afflicts Great Britain so disastrously.

How far the whittling has gone is shown by the statement in the center of the page. It shows that everyone's stake in working harder and getting ahead has been reduced sharply since 1929. In that year, anyone who was even moderately successful could look forward to reaping the rewards of his success. If he earned $5,300 annually over a period of 25 years he could retire on a comfortable income of $3,000 per year. Or he could pile up enough capital to go into business for himself. He could fulfill the American dream as phrased by Abraham Lincoln in his first annual message to Congress in 1861:

"The prudent, penniless beginner in the world, labors for wages awhile, saves a surplus with which to buy tools or land for himself, then labors on his own account another while, and at length hires another new beginner to help him. This is the just and generous and prosperous system, which opens the way to all, gives hope to all, and consequent energy and progress, and improvement of condition to all."

Look at the situation today. To retire on an annual income from investment that will buy as much as $3,000 did in 1929, a young man needs to earn over $13,000 a year for 25 years. That's more than 2½ times the income he would have needed in 1929. The same thing is true of acquiring a stake in a business.

Why Try to Succeed?

While the income needed for retirement today has increased 2½ times — or by more than 150% — since 1929, the average person's income has increased only 80%. So the average man's chances of achieving success are really slimmer now than a generation ago.

This 1929-47 trend is something new in America. The average person's chances of getting ahead improved during 1914-29. In that period the dollar income needed for retirement or a stake in business rose by 75%, but the average income rose by 100%. So more people were within striking distance of success and security in 1929 than in 1914. The story has been different since 1929.

Fewer people actually do achieve financial success today. Only 1% of all families now have incomes large enough to build up a retirement fund or a stake in business. In 1929 almost 6% of all families attained a comparable degree of success.

Higher taxes are the most important reason why it takes so much more now to build up a competence. They account for one-half the increase in the amount needed. The other half is explained by higher living costs and lower interest rates.

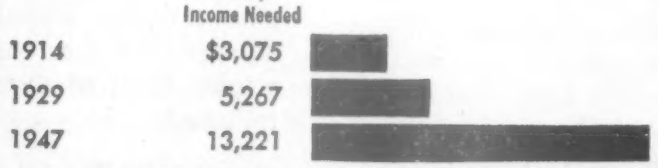
It is, of course, true that few people ever get into the higher income brackets. So the process of cutting

YOUR CHANCES OF GETTING AHEAD

To see how your chances of getting on in the world have changed during the past few decades, the McGraw-Hill Department of Economics has calculated how much it now takes to save enough to acquire a retirement income or a comparable stake in a business, as compared to what it took in 1914 and 1929.

The objective set is an income from investment equal to $3,000 a year in 1929 dollars. It is assumed that the savings required to yield this income are made over a period of twenty-five years. During that period it is also assumed that $4,000 per year (in 1929 dollars) is spent on living expenses.*

Here is how the figures work out:



It now takes more than four times as large an annual income as it did in 1914 to gain a comparable stake. It takes well over twice as much as it did in 1929.

Changes in three factors — federal income taxes, living costs, and interest rates — explain why the income needed has multiplied so. Here's how these factors line up for the three years.

	Federal Income Taxes Married Man, 2 dependents		Cost of Living (Index Numbers 1935-39)	Interest Rate High-grade Corporate Bonds
	$5,000 income	$10,000 income		
1914	$10	$60	71.8	5%
1929	$3	$40	122.5	5%
1947	$589	$1,862	155.0	2½%

Similar calculations show that if we could reduce federal expenditures from $35 billion to $25 billion annually, raise interest rates by one-tenth and lower living costs by 15% — all realistic possibilities if we make the effort — then the income needed to build up such a retirement fund would come down to $9,500. The chances of realizing that goal would then be restored to what they were in 1929.

*Several other factors were omitted from the calculations because they would not have a decisive effect on the results. Thus, existence of social security pensions and retirement funds now reduces the income needed; but if state income taxes were added, the income needed would increase.

away the incentives which play such a key role in our economic system affects comparatively few people immediately. It does, however, have a powerful indirect effect on all of us.

Everybody Loses

When half to four-fifths of any additional income of successful people goes to Uncle Sam a heavy drag is obviously put on doing the work to get it. Thus, we stand to lose the benefit of full use of the nation's best brains. By so doing we stifle industrial progress. And the loss in productive efficiency far outweighs the tax revenue the Treasury gains. Carried far enough, the process of stifling economic progress by slashing rewards leads straight to industrial stagnation.

The same process also multiplies the risks of embarking on new capital investment. High taxes rule out all but the most profitable new projects and restrict most expansions to boom times when profits are high. So capital investment follows a boom and bust pattern and, by so doing, contributes much to ups and downs in production and employment.

The Sorry Plight of Britain

The case of Britain today provides an object lesson of how blighted incentives produce industrial stagnation. *Britain's number one economic problem is to get more production. But the tax load there is so heavy it stifles the incentive to produce more.*

A coal miner who works an extra shift pays about a third of his added earnings to the tax collector. And, as the London *Economist* comments, tax rates on business executives are so high that they kill every incentive except that to tax evasion. In short, not only is the incentive to succeed blighted, but so is the incentive to work.

A root-cause of Britain's trouble is this: The cost of an expensive program of social benefits has been piled on top of the heavy costs of paying for past wars and trying to prevent future wars. Tax rates are boosted accordingly. What her experience proves is that the attempt to provide excessive social benefits may defeat itself. It raises the tax burden on rich and poor alike and smothers the incentive to work. So the underlying basis of all economic benefits—production —is eaten away.

We in the U. S. haven't traveled as far down the stagnation road as Britain has. Taxes amount to about 26% of national income here as against about 45% there. But, unless we start soon to build up incentives to do better work, instead of whittling them away as we have been doing, we will catch up with Britain fast.

It's Late but Not Too Late

Can anything be done? Decidedly yes, *particularly by tax reform and reduction in the cost of living.* As far as interest rates are concerned, any large increase would raise excessively the cost of carrying our war-swollen national debt, and hence raise taxes. But some increase in what are now excessively low interest rates may well be both feasible and desirable.

Action on the tax front is the first order of business. Our jerry-built tax structure is the thing that is chiefly responsible for cutting the incentives to work harder. Two things are important: 1) Government spending must be pared to the bone; 2) The tax system must be completely overhauled to remove the shackles on all-out production.

The 56th editorial in this series, published in March, outlined major steps that need to be taken in remodeling federal taxes in order to increase incentives to individual and business enterprise. *The revenue bill now before Congress is no more than a short step in the right direction. Much more must be done to clear the way for high production and rising living standards.*

Lifting the blight which taxes now place on incentives would help cut the high cost of living. It would stimulate greater production and greater efficiency. But a further step is necessary. Part of the benefits of improved efficiency must be passed on to consumers in the form of lower prices.

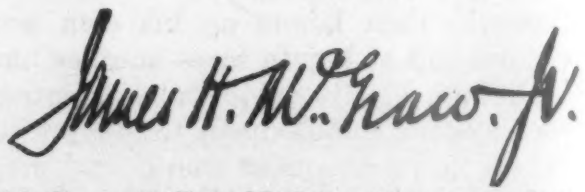
In the past few years we have been following precisely the opposite course. In many cases wages have been increased all out of proportion to increased productivity. Result—soaring prices and a severe squeeze of the consumer, to which some greedy exploitation of war-created shortages has also contributed.

To Give Ability a Chance

Our basic and most crucial problem is to get back on the track which leads to higher production and improved living standards all along the line. We got off that track in the 30's. Then, we started scrambling for larger slices of the same pie instead of trying to produce a larger pie. Now the process of getting back on the track is greatly complicated by the tremendous tax burden growing out of the war.

Yet it's not too late to turn back from the road that leads to industrial stagnation. As the statement in the center of the page shows, we could restore the odds of getting ahead to what they were in 1929. Cutting the federal budget to $25 billion a year and putting the tax structure in good order are the crucial first steps.

By taking these steps soon, Congress can go far to restore the incentives to hard work and efficiency which have been so largely washed away in the past 20 years. If they are not taken the American dream of getting ahead by hard and effective work will exist only in the history books, and our children will inherit from us an economic order without opportunity, without hope, without individual liberty.



President McGraw-Hill Publishing Company, Inc.

THIS IS THE 59TH OF A SERIES

FACTORY
MANAGEMENT AND MAINTENANCE
L. C. MORROW, EDITOR

THE MACHINE TOOL SHOW—EVENT OF NATIONAL IMPORTANCE

AN invaluable economic service is being rendered to the nation by its machine tool builders. In Chicago, in September, they will stage the greatest showing ever of the "master tools of industry."

Why is this exposition so significant?

Because a basic industry—the makers of machines on which other machines are made—shows a bewildered nation the production route to continued prosperity.

Literally, American machine tools have meant the difference between winning and losing two world wars. Literally, American machine tools have meant the difference between the highest standard of living ever achieved and just ordinary existence.

Upon the new machine tools to be shown in Chicago there will be demonstrated how further increases in the power per worker provided by industry in its productive equipment will reduce the costs of making industry's products. The results of this added power will be shown in higher speeds and feeds, greater removal of metal per unit of time, reduced idle time of machine and operator. All of which mean increased output per unit of input of materials, human energy, and power

It is by this route of greater production that the consuming, as well as the creating, power of the nation will be maintained.

It has been by the route of constantly increasing production (output per unit of input) that we have reached our present high levels. Lowered production costs have brought about lowered selling prices, increased demands, further manufacturing economies, and increasingly widespread ownership of industry's products.

The Machine Tool Show is well timed. While the nation is worrying itself toward a depression, here will be shown how to offset depression by getting rid of obsolete machine tools, replacing them by their modern high-production counterparts.

Machine tools are used chiefly by the metal-working industries, but those industries are so extensive that they have a major influence upon the economic condition of the country.

And it is not alone in metal-working that there is room for the use of more productive equipment. In the manufacture of textiles, wood products, paper products, and many other industrial goods, the procedure being promoted by the machine tool industry can and should be followed.

The Machine Tool Show is particularly well timed because of the emphasis being placed in so many quarters upon the need to prevent depression by raising wages, lowering prices, and continuing to subsidize agriculture. There is no corresponding emphasis in those quarters upon the need to achieve increased production to offset increased wages; to make possible the lowering of prices by efficient manufacture operating in a competitive economy.

It is unusually important, therefore, that the machine tool makers are at this time pointing out the only route that America has ever been able to take to prosperity, which is economical production and competitive distribution.

L C Morrow

FACTORY reports personal interviews in plant and home with workers in fourteen countries

In these pages FACTORY tells how industrial workers around the world are living, how they provide for their families, what they earn, and what they hope. The information from abroad comes from McGraw-Hill World News personnel, who in carrying out their assignments from FACTORY practically lived with workers and their families to get these close-up reports.

Automatic screw machine operators were chosen for the survey because they are representative of production workers. They have comparable jobs the world around.

THE UNITED STATES

CANADA

HOW FACTORY WORKERS LIVE AROUND THE WORLD

THE industrial worker all over the world, in all but a few countries, finds life difficult today—two years after the close of World War II.

He is worn down by the daily burden of finding food and shelter. In at least four of the great nations covered in this world-wide FACTORY survey, the worker has practically no margin between himself and hunger.

Only in the United States, Canada, South Africa, and Sweden do the workers interviewed have even the smallest of the comforts they want in life.

At the other extreme is the Indian worker who can only guess at what life will bring him.

Between the extremes are nine countries in all of which the workers fare poorly—some much worse than others.

The American worker, representing the nation with the world's highest production per worker, enjoys more of the comforts, leisure, and luxury of living than any other worker.

The devastation of war, of course, has reduced living standards in many countries. Moreover, the United States, although it devoted its major industrial effort to the production of the materials of war, was not bombed as Germany and England were. So it is obvious that the American worker will have more than the workers in most other parts of the world.

But, even before the war, the American was far better off than other workers. For example, in 1940 the American worker could buy 7.5 pounds of bread with an hour's work. The British worker could buy 5.2, the German 2.5, and the Russian only 1.9 pounds.

To buy a work shirt in 1940, the worker in the

FRANCE

GREAT BRITAIN

GERMANY

ITALY

NETHERLANDS

SWEDEN

ARGENTINA

MEXICO

CHINA

INDIA

AUSTRALIA

SOUTH AFRICA

United States had to put in 1 hour and 28 minutes of work. In Great Britain, a shirt cost the average worker 4 hours and 3 minutes of his time. It cost the Belgian 5 hours, 49 minutes; the French worker, 5 hours, 53 minutes; and the German, 9 hours and 50 minutes. The Italian had to work 17 hours and 5 minutes, more than two full days, to get the shirt that cost an American less than 1½ hours of work. About the same ratio held true for other clothing and foods.

At the same time, a French worker had to exchange 7295 hours of work for a standard moderately priced car. In Germany, the worker could earn a similar car with 5054 hours of work. The English worker earned his car in 3522 hours. But the American needed to put in only 853 hours.

The war widened the gap between the American and his counterpart abroad. And it did something else. It underlined for all people everywhere the lesson that the American system of high output and low costs, of steadily increasing output per man per hour to make more goods for more people at less cost, is the way toward higher standard of living.

Because the Amercan worker produces more in each hour's work, he can buy more with his pay for that hour.

It is high output at low cost—not planned economy, not subsidized scarcity—that creates wealth. Only in efficient production and distribution lies the hope of free peoples who want to enjoy free living with comfort, with leisure, even with luxury.

The United States

REPORTED BY CHARLES SCHUBERT, *FACTORY* FIELD EDITOR, CLEVELAND

LEONARD C. GRUGLE

LEONARD GRUGLE, Cleveland automatic screw machine operator, is working off his mortgage. And he hopes to trade in his 1940 Ford for a new car next year.

Like many another city worker, Grugle likes the fresh air and spaciousness of small-town living well enough to put up with driving 12 miles to work. His modern 6-room home is located on a 146x188-ft. corner lot in a middle-class suburb. Its good-living qualities are fortified with the full range of household appliances, from a combination radio-phonograph to a steam iron.

Leona Mae Grugle, 8½ years old, rides a bus to school every day. Lorne, 2½, is a "ball of fire" claiming a lot of his mother's attention. Each child has a bedroom. Both will go on to college if the Grugles' plans work out.

The Grugles' assets include far more than the equity they have in their house, which they bought in 1939, and their comfortable furniture, their car, and the side-yard garden. They have well over $1000 invested in war bonds, a savings bank account, educational and life insurance policies with a face value of $7000, insurance on their car and home, and a hospitalization insurance policy for the whole family.

But they are living a paycheck-to-paycheck life today. Although the family income is up about 75 per cent from 1939 (from $42 to $73 weekly), Leonard estimates that his cost of living is up about 95 per cent. He bought a suit last year. They are saving only $10 a month now, whereas pre-war

Leonard Grugle, Cleveland automatic screw machine operator, owns his home, plans to send his children to college

Tuning up his 1940 sedan in the yard of his suburban home, Grugle looks forward to buying a new car next year

Before driving the 12 miles to his home, Grugle stops for a beer and review of the local baseball club's standing

Grugle and 2½-year-old Lorne, a "ball of fire," kibitz while supper is cooking. Kitchen has electric stove and refrigerator

Lorne is a big help in getting the Grugle's 50x25-ft garden patch in shape. Family owns 6-room home and generous corner lot

The operator of two automatic screw machines, Grugle is satisfied with his job and the way his plant is run. As union steward, he hears and sifts workers' complaints

savings averaged better than $40. Except for a slowdown in buying appliances and furniture, the war has not lowered their standard of living. They eat lots of oranges, meat, fruit, and milk.

Generally, the Grugles are satisfied with their situation today, although they would like to be saving again as they used to.

With 12 years' service, Grugle is responsible for the operation of two of the 40-odd automatics in his plant. He is proud of his part in a company that produces more than a million small parts a day. Equipment is modern, is replaced as soon as new models make continued use of older machines uneconomical. Working conditions in the plant are good. Leonard will have a 2-week vacation with pay this year and is looking forward to a Christmas bonus.

Leonard is not only a union member; he is also the steward for his department. He is well satisfied with his choice of trade, but hopes his boy will do better. Mrs. Grugle wants Lorne to become a doctor.

When it comes to politics, Grugle is independent, although he has voted Democratic recently.

France

REPORTED BY MICHAEL MARSH, PARIS

HENRI AUGER

HENRI AUGER has been working since 1939 "just to eat."

Now thin and slack-muscled from eight years of precarious diet, he still spends 75 per cent of his net income just for food for himself, his wife, and their 20-year-old daughter, Lucette.

Auger lives with his buxom, easy-laughing wife and daughter in two tiny rooms and a still tinier kitchen. On the seventh floor of a Paris walk-up, the apartment has no bathroom, no central heating, no hot water. This past winter, as usual, the Augers heated themselves with a small coal-or-wood stove, but had

On a hill overlooking the big Renault plant and Paris, Henri Auger chats with *Factory*'s correspondent

Auger watches one of the overhead-drive U.S.-built automatics he operates, making small parts for automobiles and trucks

Mme. Auger hands Henri his supper soup; old radio on the wall is only electrical appliance in tiny apartment

Enjoying a rare treat—an aperitif and a smoke—Auger discusses the many shortages with cafe proprietor

no fuel about half the time. Mme. Auger does without icebox or refrigerator and with a small gas stove. Only electrical appliance is an antique radio. But madame's big problem is to find what to cook.

Bread is cheap, though rationed. Potatoes are usually available and not too dear. But a bit of ordinary meat twice a week costs $1.50 a pound. A little extra butter costs $2 a pound.

Even this would not be possible for them, however, except that Mme. Auger earns about 1000 francs a week sewing together knitted sweaters. She has undertaken this homework only in recent years. With overtime and a bonus for "dirty work," but minus taxes, Henri nets 1890 francs a week, making a total family income of 2890 francs ($24.27).

Like other French workers who cannot imagine owning their own homes or automobiles, Henri is lucky, in one respect. *Government regulations have kept his rent down to practically nothing.* He has not had a new suit since before the war. The women manage through Mme. Auger's deft reworking of their old dresses.

He is also lucky because Mme. Auger keeps the tiny apartment neat and homelike. He is luckier than most, too, in having been able to send Lucette through high school. Shortly she will have a substitute teacher's job.

Auger, with an assistant, tends four automatic screw machines in the great Renault automobile factory. Like most Renault machines, they are past their prime (Germans removed newer ones), but good for heavy use. He sees they get it. Henri served only three months in the Army in 1939 before being released to return to his job. He worked all through the war, through three heavy bombings that made a shambles of much of the 250-acre plant. He did, however, practice a quiet

slowdown as a member of the factory resistance group. Today the plant is back at 85 per cent of its pre-war production. It has been nationalized, and Henri is a staunch Socialist, having seen his working conditions substantially improved under nationalization. New shower rooms for workers have been installed; shop committees really listen to workers' suggestions and award bonuses for production improvements; a workers' committee runs social services under governmental operation; and there is a canteen where cheap meals are served.

Auger says that, while he approves of nationalization so far, he wants only those plants taken over where the boss is a "bad guy." He is disappointed at how long it is taking to get conditions back to normal.

Great Britain

REPORTED BY FREDERICK R. BREWSTER, LONDON

HENRY ALLEN

THERE'S a home of his own and a car in Henry Allen's future.

Allen, 27, sandy-haired and slender, operates a section of four automatic screw machines for one of England's largest manufacturers of precision instruments, motor and aircraft accessories, and clocks.

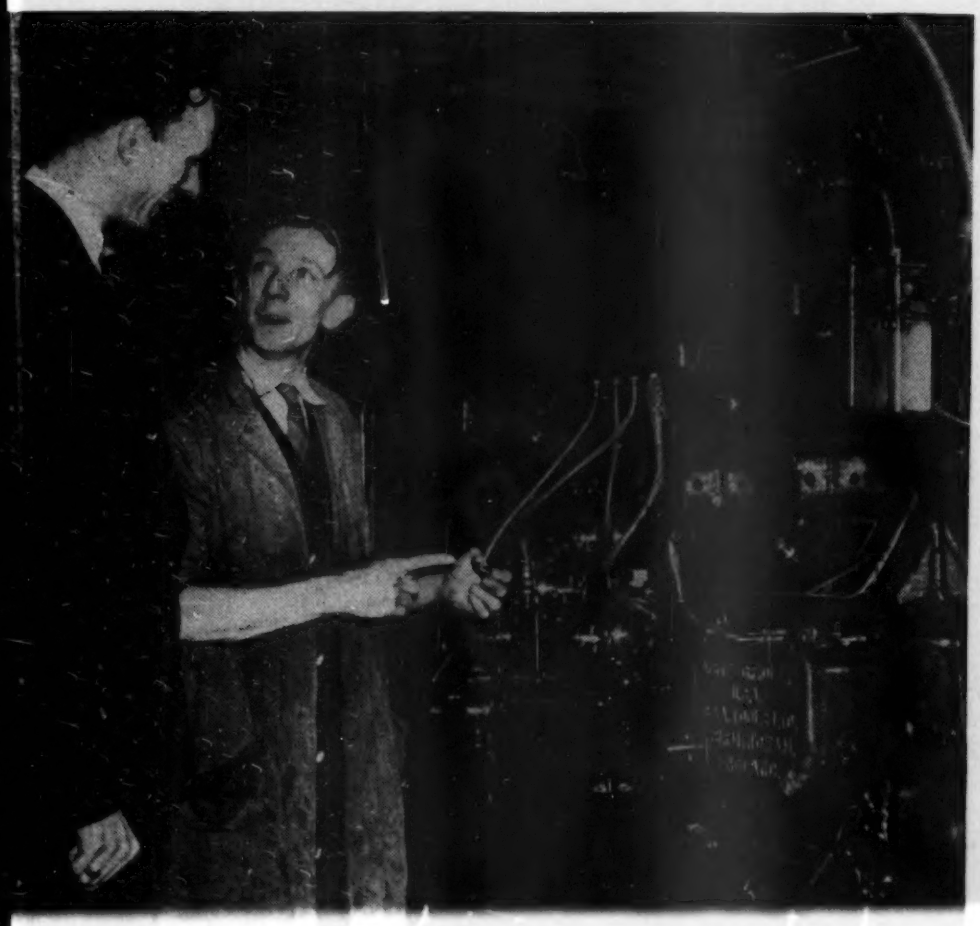
He, his wife Selina, and his 3-year-old daughter, Lynda, are crowded in a second-floor, 4-room flat in northwest London. But they feel they are lucky to have a place of their own in overcrowded, partly blitzed London.

The Allens managed to keep fairly warm last winter with their single fireplace. But even now, when they would like to use their small electric heater on damp days, they are reluctant because of the government's request to conserve electricity and fuel.

Their diet is rather poor, certainly not as good as they were able to afford before the war. It is deficient in variety and in quality, if not in the quantity of staples such as bread, which is still rationed, and potatoes.

Before the war the Allens ate fresh meat almost every day. Now their total meat ration gives them just enough for a Sunday "joint" and a tin of canned corned beef for one other meal. Fish is cheap and plentiful, but takes considerable time to queue up for. The Allens are fortunate in that Henry and Selina get their noon meal five days a

Slim Henry Allen operates four automatics, takes pride in their output. Here he explains them to *Factory*'s London correspondent



Meat is a twice-a-week treat for the Allens. They have enough to eat, but diet is monotonous

Helper looks on while Allen checks tolerance on a part. Machinery in the shop is up to date, but materials are short in quantity, low in quality

The Allens start for the movies. She likes them, but he prefers the dog races and a modest bet

week at the works canteen. It is hot, filling, and usually includes some hot meat.

Clothing in shortage-ridden England is a problem. Henry hasn't bought a suit since the end of the war because one suit would take up a 6-months' supply of clothing coupons, even though he gets an extra ration as a factory worker. Selina, however, is a fine seamstress and makes many of her own and the baby's clothes on an electric sewing machine. In addition to the sewing machine, they have an electric clock, a 10-year-old table radio, and a small heater among their home appliances.

On the job, Henry is busy pretty steadily, keeping tabs on his four machines. He checks tolerances when the shop has a long run and, if he has any spare moments, takes on a share of his helper's load. His present helper has been teamed with Allen for seven months. He keeps the bar stock feeding properly, checks dimensions, helps replace and reset cutters, and is learning the whole business.

Allen likes his job, likes his airy, well-lighted shop, and feels grateful to the firm for the time and effort spent on training him in the 12 years since he started there as an office clerk. During the war, he and his fellows worked right through the air-raids, taking cover only after spotters gave the word that German bombers were headed right over the plant.

Selina works in the same plant, not because she has to, but to take up her time and give them a little extra money for holidays, movies, and Henry's once-a-week visit to the White City dog-racing track.

The greyhounds are such a "vice" with Henry that he takes a lot of kidding around the shop. He is not too fond of reading, but goes through two daily newspapers regularly. He does putter around some in a makeshift carpenter's shop he has fitted up at home. Presently he is making his 3-year-old daughter a doll's house. And he has started spading up a small corner of the backyard for a garden, hoping chiefly for vegetables to break the monotony of their diet.

They are saving 30 shillings a week. They were able to do this all through the war, although some of their early savings went into costly "util-

ity" furniture. They have enough put by, though, so they feel secure. They wouldn't be bothered by a shutdown lasting a couple of weeks, although Henry never has been laid off.

Their savings, plus his post-war credit of wartime forced savings, will easily manage the down payment on a 3-bedroom house, farther out in the suburbs, as soon as restrictions ease and prices drop. Henry always has wanted an automobile, could well afford it and the pound a week to run it, but feels prices now are too high.

Henry is a union member, belongs to the Labour Party, and voted Labour in 1945, but is no Socialist. He believes in accomplishing reforms by democratic means and feels that nationalization will only begin to pay off two to five years hence.

Germany

REPORTED BY JOHN J. CHRISTIE, BERLIN

ROBERT HERFURT

THE lot of Robert Herfurt, 47-year-old automatic turret lathe operator in the Krupp shops in Essen, cannot but appear incredible, or at least an extreme case, unless the unprecedented combination of adverse economic conditions in Germany is kept in mind.

Scarcity of the necessities is so extreme in Germany today, two years after the country's defeat, that earnings from gainful employment bear little or no relationship to the circumstances in which a worker and his family live.

Employment cannot insure enough to eat. Few Germans would have difficulty paying for their legal rations, but even the meager ration of 1550 calories per day for a normal adult is not being met in most industrial areas of Western Germany.

A German worker's home and household belongings are likewise no criteria of his earnings. They are usually what the fortunes of war left him.

In the industrial areas, nine chances out of ten, his home is either damaged or destroyed. If damaged, repairs, if any, are crude. If destroyed, he and his family may be living in the cellar, in a patched-up room in a bombed-out dwelling, in an air-raid bunker, in a shanty, or with another family.

Robert Herfurt's working conditions are actually much more stable than is common in the Ruhr today. And more comfortable than usual is the dwelling he has provided for his wife, two daughters, 15 and 9, and his 19-year-old son and co-breadwinner.

Their factory-owned house near the Krupp works was destroyed in an Allied air attack in 1943. Herfurt's family was evacuated. By the end of the war, Essen had been reduced to 15 per cent of its former self, although its population was back to near-normal numbers. Where all the people live mystifies visitors.

Herfurt, however, was leasing a garden plot. On it, with bricks culled from rubble and mortar made of ashes and clay, he built a 2-room house. From Krupp he got sheet metal for a roof, a few pieces of scrap glass for windows, enough lumber for flooring, and some lime to make plaster. On the rest of the small plot he raises hardy vegetables to give some substance to the watery soup which has been the family's main dish through the winter.

The search for food occupies a large part of Frau Herfurt's day. At the big Krupp cooperative in

Of the 9 square miles of Krupp-Essen plant, only the small section in which Herfurt works is usable. The rest is rubble

Vegetables are counted on heavily to give substance to the watery soup which is the Herfurts' twice-a-day meal. All extra clothing was sold long ago to get enough food

One room on the second floor —this is a "typical" Essen home

downtown Essen, which opens at 8 a.m., people start lining up for bread at 1 o'clock in the morning. Like all other Germans, the Herfurts' prime interest in life is trying to obtain extra rations on the black market. Absenteeism for this purpose is an accepted fact in industry.

To get extra rations, the average worker must exchange personal belongings, or spend savings or illegal profits. The Herfurts' savings and all their extra clothing went long ago to farmers or their agents in exchange for food. For the last six months virtually all of Robert's and his son's wages have gone for food. Even with the extra rations he gets as a "heavy worker," the Herfurts can't get the

This report from Germany continues on page 78. Chart on following pages summarizes workers' incomes and living expenses in fourteen countries

John Christie, *Factory* correspondent, watches Herfurt build a brick wall of rubble to add a third room to his house. Actually, it is more comfortable than most workers' homes in Essen, where bombs destroyed nine out of ten dwellings

WORKER INCOME AND OUTGO IN 14 COUNTRIES

Figures in U. S. dollars, at official rates as of April, 1947, except for Italy, where export rate was used (official rate meaningless because of inflation)

	United States Leonard C. Grugle	**France** Henri Auger	**Great Britain** Henry Allen	**Germany** Robert Herfurt	**Italy** Giacinto Bergandi
His straight-time, hourly rate	$1.45	$0.42	$0.94		$0.15
Hours he works each week including average overtime	40	45	44		55
His average weekly income including overtime, bonuses, and cost-of-living allowances	$73.00	$18.90	$44.00		$8.61
Total weekly income including earnings of others in family, government allowances, extra work	$73.00	$27.29	$56.00		$10.27
Weekly food costs for family	$28.50	$17.65	$12.00		$9.85
Weekly cost of shelter	$10.40[1]	$0.32	$4.00		—[1]
Direct taxes paid weekly	$4.11	$3.02	$13.10		$1.03
What's left of his average weekly income after paying for food, shelter, and taxes	$29.99	$6.30	$26.90		−$0.61
Number in family	4	3	3		4
Number of times they eat meat each week—not including factory lunches	10-12	2	2		2-4
Number of rooms they have	6	3	4		4

Figures here would mean little because of extreme shortages in Germany today

1. These families own their homes; figures shown include interest, amortization, and taxes

The Netherlands Hendrik Jan de Goede	**Sweden** Knut Evert Carlsson	**Argentina** Marcial Perez	**Canada** Raymond Day	**Mexico** Gregorio Sousa Landin	**China** Yang Yung-Hai	**India** Dattraya Ramchandra Pawar	**Australia** Bernie Bennett	**South Africa** Harry Davis
$0.48	$0.79	$0.38	$0.82	$0.30	$0.09	$0.11	$0.41	$0.45
48	48	45	48	48	75	48	49	48
$23.04	$37.80	$17.50	$39.36	$14.00	$13.84	$8.28	$24.00	$30.55
$24.32	$37.80	$17.50	$43.36	$18.50	$13.84	$8.28	—[4]	$43.00
$14.44	$16.80	$8.75	$18.00	$10.00	$6.25[3]	$4.20	$29.34[4]	$17.10
$2.23	$4.48[1]	$2.00	$4.65	—[1]	$0.46	$0.56	$5.15[4]	$10.84[1]
$1.50	$4.54	NONE	$0.77	$0.14	NONE	NONE	$3.80	NONE
$6.15	$11.98	$6.75	$19.94	$8.36	$7.13	$3.52	$15.30[4]	$15.06
4	4	2	4	6	4	2	9	5
1	4-6	14	8-12	1-4	1	1	7-14	4
4	3	3[2]	5	3	1	1	5	5

2. Shared with another family

3. Computed before recent sharp rise in price of rice

4. Bernie is not married; lives with his parents.He contributes $4.90 a week to the family budget of $29.34 for food and fuel, plus $5.15 for rent

minimums of rationed food, must buy whatever else they can at black market rates.

Breakfast is usually a cup of *ersatz* coffee and two or three slices of bread. The other two meals are soup containing various combinations of vegetables and cereals. Meat—when they can get it—is reserved for Sunday dinner.

The locomotive shops, where Herfurt works, occupy the only usable buildings remaining of the world-famed Krupp-Essen steel and armament works, which covered 9 square miles of the city. About half the machines for locomotive building and repair were salvaged. Shifts work a 42½-hour week now, since the men cannot stand a 6-day, 48-hour week on current rations. Twenty-three years' service and the hope of a pension have given Robert an unusual loyalty to Krupp's, but even he takes a day off now and then to search for food.

At 47, Herfurt is a comparatively young factory worker in present-day Germany. The average age of the Krupp working force of about 3500 is 45.

His son, who was discharged from the Army by the British after he escaped following capture on the Eastern front, is a carpenter's apprentice.

Herfurt is a middle-of-the-road Social Democrat. He goes along with the party's idea of fighting for socialism, but believes it is not of immediate practical importance. He is emphatically of the opinion that very few of his fellow-workers have Communist convictions. He shrugs off the attention Communists are getting as inevitable in the present state of dissatisfaction in Germany.

Italy

REPORTED BY MICHAEL MARSH FROM NORTHERN ITALY

GIACINTO BERGANDI

SPAGHETTI is no longer for the likes of Giacinto Bergandi.

Friendly, wiry, but worn-looking, 36-year old Giacinto is far from satisfied today. Never within his memory has it been so hard to keep alive. He works 10 hours a day, 5½ days a week, and on Saturday his paycheck amounts to only 5270 lire. To feed himself, his wife, their 5-year old daughter, and his father, even with the help of their little garden, costs 5900 lire.

Last winter was grim for the Bergandis. Now, with warmer weather, the 64-year old father brings in 200 to 300 lire a day as a farm laborer. That balances the food budget, but leaves nothing for anything else.

Like many another Italian worker, Bergandi comes from the farm. He is lucky to have his father's country-style 4-room house and its garden. On the edge of the small city of Ivrea, in Northern Italy, the house is of solid plastered stone, but barren of most conveniences. The Bergandis make only slight use of electricity, must use an outside toilet, have no bath, have running water only in the kitchen, and don't even have a radio.

At his post in the plant, however, Bergandi can gaze through the glass side of the factory up the steep, snow-covered slopes of the foothills of the Alps. He can smoke, chat, use an up-to-date washroom, and get a cheap but substantial meal in a huge basement cafeteria. The Olivetti family, owners of the factory producing typewriters and calculating machines, have a modern plant. Most of it was built in the 1930's. They, like other industrialists in the progressive North, pride themselves on trying to meet American standards for both efficiency and social services. They have, for instance, an ultra-modern kindergarten for the children of their employees.

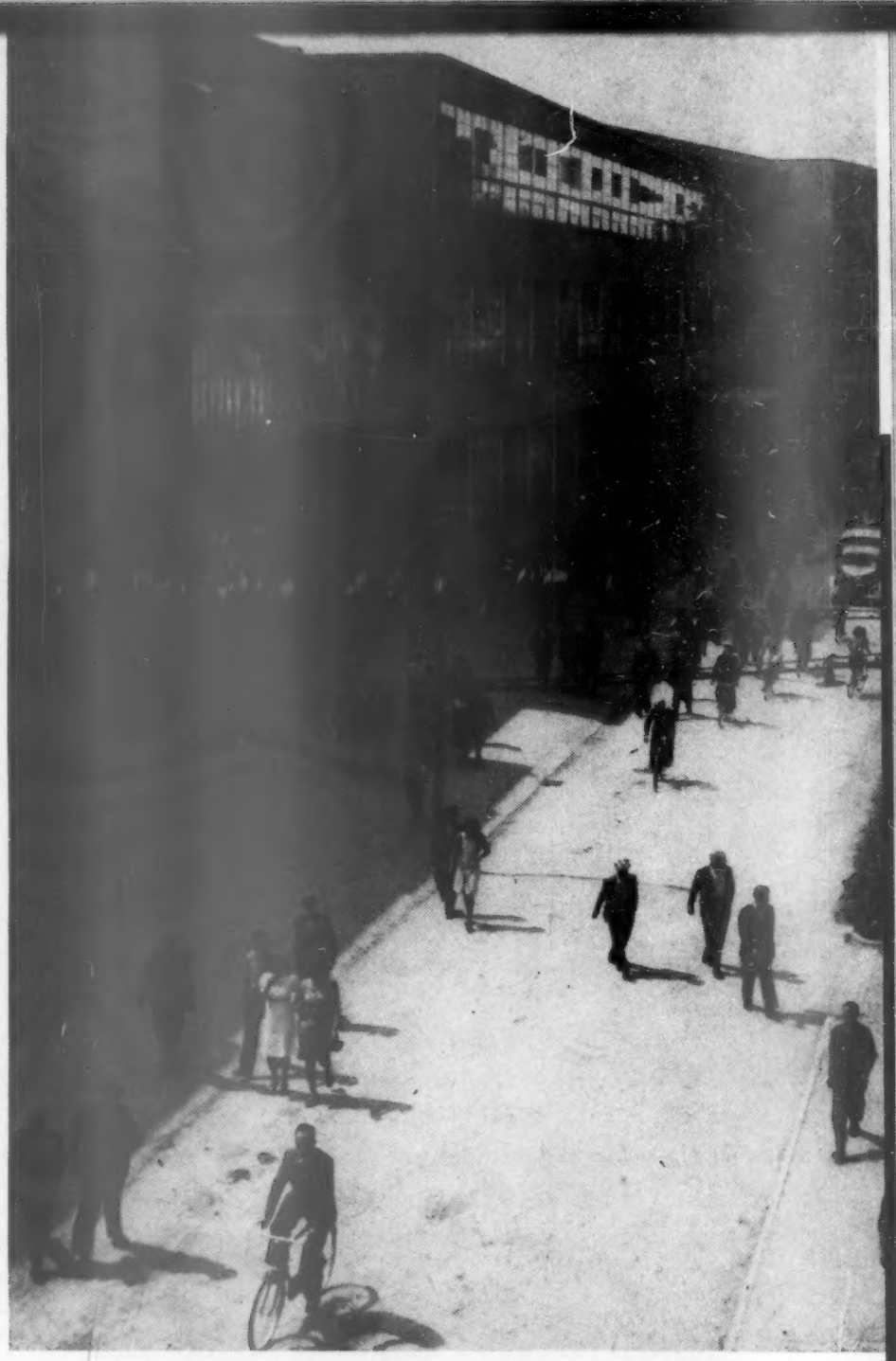
Bergandi and his wife are confused as to how and when things will get better. But they are not despondent. He follows the lead of the Communist-dominated metal workers' union, but at the same time the terracotta Madonna and Child stay in their place of honor above the Bergandi bed.

The outlook for Bergandi is gloomy, as it is for all Italian workers. The plant was not damaged during the war, having been saved by the Partisans from last-minute German efforts at demolition, and output is about as high as it was before the war. But raw materials are increasingly expensive. The Olivettis, too, are hampered in increasing wages because they are forced to keep on the payroll about a thousand extra workers, who add nothing but were hired for non-pecuniary reasons during the war. The total on the payroll is 3000.

Unemployment in Italy is now over the 2,000,000 mark, so Bergandi can do little to improve his personal lot. All he can do is to hope for the return of the days when he could sit down to a big meal of spaghetti. It is far too expensive for him now.

Bergandi and his wife weed the small garden which, with a few chickens and rabbits, keeps the family healthy

Bergandi's 5-year-old daughter enjoys up-to-date nursery school equipment in the kindergarten run by his factory



In progressive Northern Italy, at Ivrea, the Olivetti plant in which Bergandi works is modern, tries to meet American standards

The Netherlands

REPORTED BY PAUL CATZ, AMSTERDAM

HENDRIK JAN DE GOEDE

HENDRIK JAN DE GOEDE and his family usually eat their dinner "out of the pan" because they are so short of dishes and plates.

Hendrik, his wife, and their two sons, live in a small town outside of Utrecht. They rent a tiny, 4-room, paintless house with orderly strips of garden both front and rear. The inside is neat and clean in the Dutch tradition. But rugs are threadbare, sheets and pillow cases little more than rags. The family has only three cups and saucers with two half-broken mugs for the children. Pots and pans are badly needed.

The de Goedes are not short of food. They have enough bread, potatoes, and "hotchpotch"—mixed potatoes and cabbage. They have, however, only a few slices of meat a week, a little fish, and practically no fruit. It is a monotonous, one-sided diet. Clothing is a major problem, particularly under-

Shortages of iron and steel stock retard production in the small but well-equipped and well-managed shop where Hendrik Jan de Goede has worked more than 20 years. About 40 of its 105 Swiss automatic screw machines were taken by Germans

De Goede, correspondent Paul Catz, and plant manager. De Goede's wages rose 50 percent, while living costs doubled

wear. Coal was in shorter supply last winter than in the "starvation" winter of 1944-5.

Conditions in the Netherlands are improving. The de Goede family has been allowed to buy some textiles, making the children slightly better off. But saving is impossible for them, which means they have no chance of owning their home, and not the slightest chance of ever owning an automobile.

A veteran of 20 years in a small but well-equipped and well-managed machine shop, Hendrik likes his job. He is a union member and he and his 70-odd fellows say they get action on complaints about working conditions.

He is neither communist nor collectivist. He looks to democratic freedom, such as Holland and the United States have, to better his future. Although tension between wages and prices is sharp, he is opposed to a general rise in wages and believes in lowering the price level.

De Goede is not optimistic about a return to normal conditions, however. He believes it will take at least 10 years.

Sabots—wooden shoes—were brought back into wide use during the war. Clothing is still scarce in the Netherlands

Sweden

REPORTED BY G. HOWARD SMITH, STOCKHOLM

KNUT EVERT CARLSSON

KNUT EVERT CARLSSON's wealth can't be counted in dollars.

Like that of other Swedish workers, it consists at least as much of what he enjoys cooperatively with his fellow-citizens through social organization as it does of what he owns.

His home is an example. The city owns the land on which it and all its neighbors stand. A municipal agency arranged the 30-year loan with which he bought the 3-room prefabricated cottage. Just across the street from it is a play space of several acres, well equipped for children of all ages, and with a salaried attendant in charge all summer. Knut's two children, a boy of 8 and a girl of 3, use it frequently. There is no charge for it.

At school the boy receives a free lunch, free tuition, and free school materials. Carlsson has sickness and unemployment insurance through recognized societies with government, not employer, contributions.

Fru Carlsson does about half of her shopping in a cooperative, about half in the shop of a small individual trader. Food and fuel rations are adequate. The Carlssons' diet is similar to an average American's with probably a little greater emphasis on potatoes, bread and butter, and milk.

Furnishings in their cottage are simple, but of good quality and well kept. Household appliances are not common in Sweden, being generally considerd unnecessary. Automobiles, also, are not necessary for the average Swedish family, although some of the Carlssons' neighbors do have them.

Fru Carlsson does have a sewing machine and makes many of the children's clothes, which is usual in a country where such clothing costs about as much as does an adult's.

Boats, not automobiles, are the great recreation of Swedish workers. Knut has had one and looks forward to having another, especially when his "rent" and family costs ease off.

Carlsson has worked for a diesel engine manufacturer since 1926. He likes the work and was himself responsible for persuading other automatic screw machine operators to go over to a piece rate system instead of the straight hourly rate. They are all satisfied with the arrangement. Like the majority

Knut Evert Carlsson, Swedish operator, well off compared to other European workers, still is bothered by shortages

To make the most of a lunchtime break, workers race out of the plant. Men like short noon period so they can finish day early

Although coffee is rationed, the shortage has not been allowed to affect the Carlssons' hospitality. House, like many in Sweden, is prefabricated

Carlsson, shown as he walks with friends, believes in democratic socialism

of the 1200 workers at the plant, Knut is a union member. Complaints about working conditions are directed through well-oiled channels of communication between worker and employer organizations.

Swedish workers—and Carlsson with them—look to increased economic, as well as political, security on a collective or socialistic basis, but arrived at by democratic means. They seem ready to take the pains and use the patience and restraint it requires.

Today "expansion" is the word in Sweden—expansion of the kind that is possible only with new and more efficient machinery so output can be stepped up. Back of the country's policy is a determination to avoid unemployment—hence its broad support by the masses. Unions are actually demanding increased productivity.

Argentina

REPORTED BY E. G. MALEY, BUENOS AIRES

MARCIAL PEREZ

MARCIAL PEREZ leads a simple life and spends little on diversion. But he cannot save.

Like many another Argentine worker, Perez and his wife double up with another family. They share a 3-room brick house with another couple and the mother-in-law of one of them. The families use a common kitchen. Heating is not a problem in mild Buenos Aires. Food is plentiful and unrationed. And Marcial's entertainment consists of watching sand-lot soccer or reading in the shade of the fig and peach tree in the patio of his home.

Marcial's wealth consists of two suits, one for Sunday and one for working, and a pretty nice set of bedroom-dining room furniture. He has no expectancy of buying a car, or of owning his home, or of buying any more furniture or home appliances.

He has hopes for his country, though. Argentina is young, he believes, and the future will be better. When the rest of the world gets back to normal, he thinks Argentina will follow suit.

There is friction and lack of understanding between management and workers in many Argentine companies, but Perez feels he has a good job in a well-managed plant. He wants his sons, if he has any, to be well educated, but he would be pleased to have them work for the same company. He works steadily, although a shortage of materials limits expansion. To reach its present production, his firm designed and built its own automatics.

Canada

REPORTED BY J. F. FLAHERTY, OTTAWA

RAYMOND DAY

RAYMOND DAY, 29-year-old Canadian operator, makes a little less than the average U. S. worker, but probably lives as well, may even eat a little better.

Earning $39.36 a week, and receiving a $16-a-month family allowance from his government, he rents a comfortable 5-room frame house, has it well furnished, has a few hundred dollars in the savings bank and life insurance, and drives a 1932 Ford. His hobbies are fishing, swimming, and hunting.

The Days — including two daughters and a baby boy — eat well. Their daily diet includes four quarts of milk, a dozen eggs, and plenty of meat. Mrs. Day buys three dozen oranges a week and does her own baking.

Raymond recently bought a blue serge suit. He thought it sound economy to buy a second pair of pants, bringing the cost to $80.

He is a member of the UAW, thinks his plant is well run, and likes the spirit of cooperation evident in the factory. The management makes a point of treating workers with fairness and consideration,

Raymond Day, Ottawa automatic screw machine operator, earns $39.36 a week, gets monthly "family" allowance of $16

Listening to the radio is a family pastime. Day holds 3-year-old Marin. Shirley, 6, sits on the floor, and Mrs. Day holds baby James. Unpretentious but comfortable, their house is well furnished, has modern kitchen with electric stove and refrigerator

he says, and honest grievances get prompt action.

A middle-of-the-roader, Day is chary of admitting to any particular party label. He has no radical views and is satisfied with the present system of government. There is more work in Canada than before the war, he points out, but he feels that conditions will not become normal for five years.

So far he has no plans for his 16-month-old son. But he thinks the opportunities for a young man in Canada equal those anywhere.

Mexico

REPORTED BY ERNEST HEDIGER, MEXICO CITY

GREGORIO SOUSA LANDIN

GREGORIO SOUSA LANDIN works in one of Mexico's most modern factories, but his wife cooks his tortillas on a charcoal hearth.

Like most industrial workers in Mexico, Gregorio, who is 35, went to work in a factory during the war. Before that he was a laborer. He makes 67.90 pesos (about $14) weekly, and his 13-year-old son Vicente, an apprentice in the same factory, earns 3.50 pesos ($.75) daily.

By American standards, Gregorio and his family —consisting of his wife, his mother-in-law, two sons, and two daughters—live poorly. They have an adobe brick shack, owned by the mother-in-law, and containing two very small rooms and a kitchen. They have electricity, but no gas, no stove, no refrigerator, no bath, and no heat, although the winter temperatures may drop to freezing.

Lack of household appliances in the Landin home is almost complete. A few pieces of furniture, some crockery, and a calendar on the wall are just about all they own.

Mexico has no rationing, but Señora Landin must queue up to get charcoal for her cooking fire. Price control is absolutely ineffective except on corn, the number-one foodstuff and basic ingredient for tortillas (corn pancakes, to us).

High prices in the free market don't worry Gregorio. His income won't stretch around fancy goods, anyhow.

Gregorio believes he is freer now that he is employed as a screw machine operator than he ever could be as a laborer. He likes his work and feels that the steel furniture and appliance factory is well run. He is worried only about getting enough to feed his family, and possibly a little more so he can have a good time once in a while. An extra day of leisure would mean more to him than better food or clothing.

He is a union member, but is pretty much bossed by the union leaders. He has only the vaguest idea of democratic freedom. He instinctively distrusts all politicians and officials, feeling that they are in there only to get rich quick. He votes only once every six years, in the Presidential elections, and even then he's not sure that higher-ups in the party are not manipulating his vote.

Gregorio Sousa Landin and his son, Vicente, leave work. Vicente, 13, works as an apprentice in the plant during the day, goes to school from 7 to 9 each evening

Grandmother, mother, and four Landin children pose for a portrait. Their house, on outskirts of Mexico City, is made of adobe brick, contains two rooms and kitchen. It has no bath, no gas. Cooking is done on rusty plate supported by four stones

China

REPORTED BY ALPHEUS W. JESSUP, SHANGHAI

YANG YUNG-HAI

YANG YUNG-HAI, one of Shanghai's few skilled machinists, is bound by ancient custom to buy land for his grandfather's and his father's graves. At present, he has only hopes of doing so.

Yang's average weekly income this spring was $166,040 (in Chinese money). In 1939 it was $6. But the cost-of-living index was frozen in January at 7945 times what it was in 1937. Yang is a little better off now since he is paid $43,697 for 15 hours of overtime.

In U. S. dollars, Yung-Hai makes only $13.84 for his 75 hours of work each week. That figure is computed at the official rate of $12,000 Chinese for one U. S. dollar. Black market rates make the Chinese dollar considerably cheaper.

Yang, his wife, and two daughters, 7 and 2, live in an attic room at the head of three flights of dark, ladder-steep stairs. A bed, stool, two rough chests, a small table, and three shelves holding toys and a clock make up its furnishings.

The family eats well, for China. Rice and veget-

Work done, Yang Yung-Hai heads for home. In the 25x30-ft. room he is leaving are seven locally made machine tools

Daddy Yang reads the "funnies." Little girl's leather shoes are sign of better-than-average standard of living

ables make up the bulk of their diet. Four pounds of meat a month and two pounds of sugar — for the children — are delicacies.

In summer Yung-Hai wears rough cotton shirts and shorts; in winter, a cotton padded jacket and trousers with a woolen sweater underneath. The women wear cotton dresses, padded in winter.

Last year Yang managed to save $500,000. He invested it in kerosene, which has become scarce this year. But his savings are held against the rainy days that plague China's masses. And, of course, there is always grandfather's grave.

A job is a living in China. What you do or what you like, matters not. Yang, however, likes his job and is proud of his skill as a machinist. He operates a belt-driven engine lathe.

By American standards, working conditions are worse than poor. But Yang is philosophical. It is a small shop and he doesn't see how it could be improved very much. Relations with his employer are friendly and cooperative — a family atmosphere.

Yang's political outlook is limited. He has nothing to say about his government or governors except that one is usually as bad as another. Democratic freedom or collective political security means nothing to him. As long as he is left alone to work for his rice, vegetables, clothes, and shelter, he is content.

Even that small measure of contentment is threatened every day, however. When I first saw Yang, early in the spring, rice prices were stable and he had to work 39.3 minutes to earn enough rice to give him 2000 calories. A sudden upward turn in rice prices in April, however, required him to work 58.95 minutes for his 2000 calories.

A government order freezing wage scales will delay any adjustment in wages. A compromise will be forced eventually, but in the meantime, Yang's small hoard of kerosene will go and grandfather's grave will be just that much further away.

India

REPORTED BY JOSEPH K. VAN DENBURG, BOMBAY

DATTRAYA RAMCHANDRA PAWAR

WITH INDIA'S low wages and war-inflated prices, Dattraya Ramchandra Pawar and his wife live on the minimum subsistence level. He has no children — and neither he nor any other machine tool operator in his shop can afford to have children.

Pawar, a machinist capable of setting up the average turret lathe job, gets a base wage of 86.8 cents in United States currency. A "dearness allowance," or cost-of-living bonus, brings that up to $1.37. But it costs 60 cents a day just to get the minimum food to keep him and his wife going.

Pawar's home is in a brick-and-concrete tenement off a smelly alley in the bazaar section of Bombay.

He lives in a single third-floor room, about 9x8 feet, and with a "kitchen" on an outside balcony. Furnishings consist of one bent armchair, a stool, a table, and a great variety of brass pots and pans. His wife cooks in them over a charcoal brazier. They sleep on a cotton pad on the floor, wrapped in one thin blanket.

Black market prices complicate Pawar's financial problems. Cloth prices, for instance, are controlled on yard goods, but not on finished clothing. So the

poorest suit, of ill-fitting khaki or a comparable "standard drill" cloth, costs this Indian worker nearly a week's pay. Similarly, in buying food he can get enough rice to get by on, but fresh vegetables and finished foods of any type are uncontrolled in anything but theory.

Pawar has no savings, no chance of owning his home ever, unless he goes back to the soil and can get a hut, and little chance of getting any appliances other than the old clock and the pots and pans he now owns.

There is no electricity in the "chawls" where he lives. To save the cost of kerosene, he and his wife—a quiet little girl who squatted in the corner during my visit—go to bed soon after dark.

Pawar works in a bicycle plant built just before the war. It now employs about 900 men on three shifts. The steel shortage has delayed both plant expansion and hopes of increasing production. As a result, the entire plant is overcrowded and facilities for its workers are mostly in the future. However, Pawar is satisfied with his job as a career, but not with it at present. He will stay with the company only if assured of promotion to the rating of tool-setter, which pays about 25 cents a day more. Even a foreman, which he might become some day, is paid only about $38 a month. There are no industry-wide unions in India, but only a great mass of individual shop unions.

It is safe to say that under existing religious conditions and economic factors there will never be a democratic system such as Americans know.

Home to this Indian worker is a 9x8 tenement room. His wife cooks in balcony kitchen. Her brass pots and pans are about the only household goods she owns

Australia

REPORTED BY HERBERT LEOPOLD, MELBOURNE

BERNIE BENNETT

BERNIE BENNETT is an Australian automatic screw machine operator. He is one of the non-unionized 10 per cent who were not on strike when this was written. The 90 per cent were out in the bush, trapping rabbits.

Bernie is a "process worker" in a Melbourne engineering company. Under this classification is included his unskilled production job, feeding automatic screw machines. Bernie hopes to advance to a skilled setter's job before Christmas. He also hopes to get married and set up housekeeping in a 4-room Housing Commission dwelling, as yet still in the "projected" stage.

After 4 years' Army service as a sapper in a bomb-disposal squad, Bernie was discharged last year and drew down £236 (about $780) in deferred pay. He was offered a job by his last pre-war employers and took it.

Bennett promptly put £198 of his £236 into a 1929 Fiat, and then found that maintenance and gasoline took about everything left over after he had paid his board and lodging. He sold it, and it's likely to be a long while before he owns a car again.

Nine Bennetts live under the roof of a 5-room clapboard house about 5 miles from where Bernie works. He is the largest underwriter of the family

Bernie, center rear, and most of the Bennetts meet for afternoon "tea." He is the largest contributor to the family budget

With a friend, Bernie leaves his plant for a workout at football. A veteran, he hopes to be promoted to tool-setter this year

budget, contributing 30 shillings ($4.90) of the £7 plus ($24) he averages in wages.

The Bennetts eat fairly well. Under today's conditions, their diet is quite like that of even the well-to-do in Australia. Staples are either rationed at low prices, or are unrationed but subsidized in one way or another. Sugar and meat are temporarily off the market because of strikes or ceiling-price troubles. Fruit and vegetables, which are neither subsidized nor rationed, however, put an unbalancing drain on the budget of the Bennett family.

Bernie, after buying his limit of rationed clothing and paying for his recreation, a bit of gambling, and his dates with his girl friend, is saving money.

He likes his job, although much of the equipment is obsolete, liable to breakdowns, and inefficient. However, he has no aspirations beyond promotion to setting the automatic screw machines and thinks it wouldn't be a bad trade for his sons — when and if he has any.

South Africa

REPORTED BY TONY ADAMS, JOHANNESBURG

HARRY DAVIS

HARRY DAVIS owns his own home—and a 1929 Chevrolet. Rather ramshackle when he bought it, the Davis home is now a neat whitewashed house in a new suburb north of Johannesburg with about an acre of ground and a fine view. Although he works a 48-hour week throughout the year, Harry himself practically rebuilt the 5-room cottage.

Harry earns £400-odd ($1600-$1800) as a machinist in a mining company's machine shop. To this income, he adds about £100 by repairing automobiles in his spare time. The Davis family is maintained comfortably.

He, his wife Noreen, two boys in high school, and 7-year-old Jacqueline eat well. They have either meat or eggs every day, plenty of vegetables and bread, and about three pints of milk a day. They have solid, serviceable furniture, a coal-burning cookstove, but no electric appliances except an old-fashioned radio.

Operator of three machines for threading bolts and pipes, Davis finds working conditions good. The mines offer security and steady work. He looks to free enterprise for his future. And he hopes to go into business for himself as soon as he can find a site for a small garage.

CONTAINERS ARE CONTROLLING FACTOR IN PRODUCTION INCREASE

HUGH T. MONSON • CHIEF INDUSTRIAL ENGINEER, THE EUCLID ROAD MACHINERY COMPANY, CLEVELAND

Increase the production of heavy-duty, 15- to 40-ton capacity, earth-moving equipment by 300 per cent. Those were the orders—the specifications for the new plant of The Euclid Road Machinery Company, Cleveland.

The new plant was limited to about double the area of the old, and it was desirable to change from two- to one-shift operation. Put those facts together and it can be seen that each square foot of the new plant had to do three times as much "work" as the same square foot in the old building.

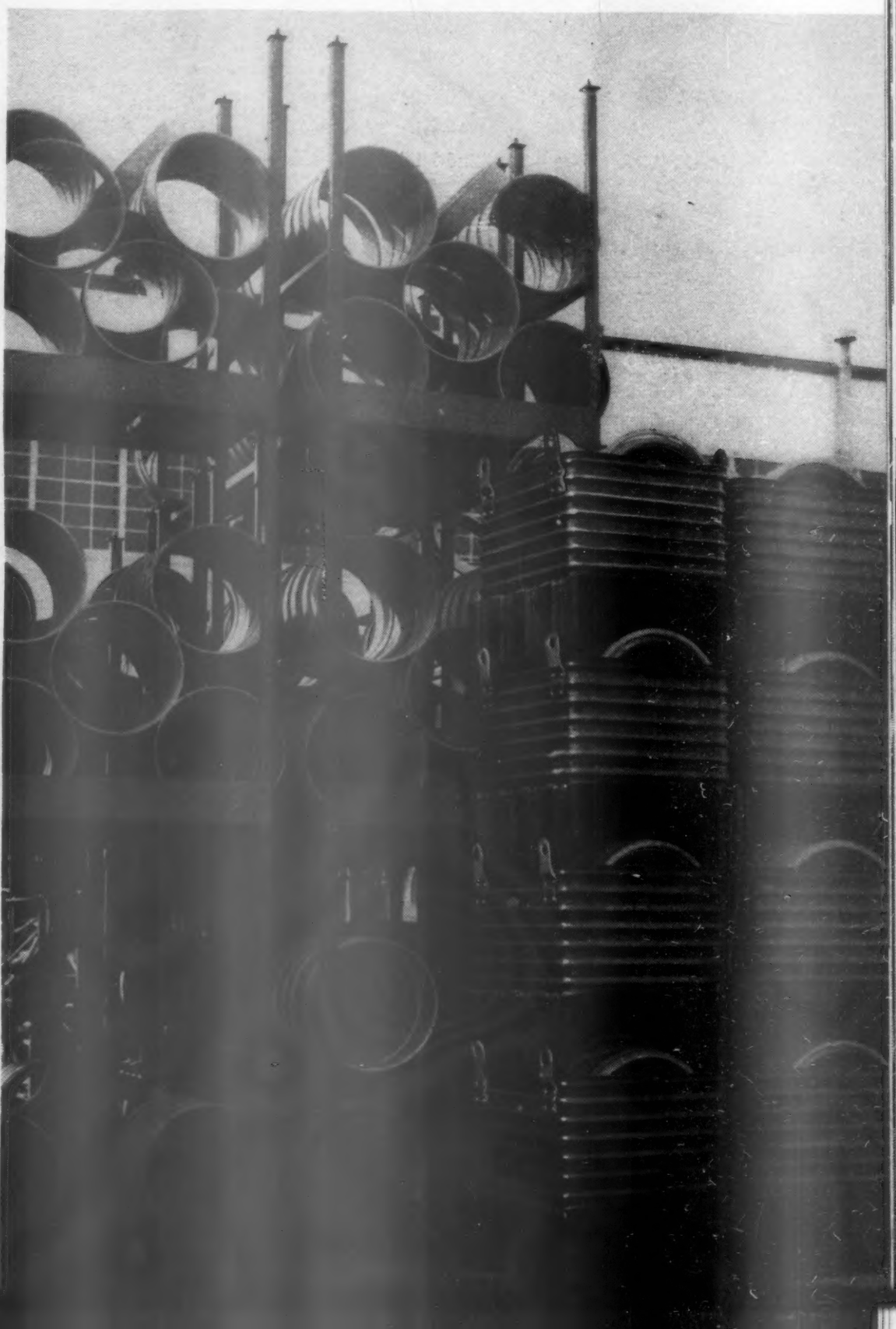
The problem finally resolved itself into one of storage and materials handling—utilization of vertical space, elimination of handling wherever possible, and simplification of the remaining handling. A big part of the answer lay in the adoption of seven standard "carriers," which put almost all storage and handling on a unit load basis.

Odd Shapes—No Tiering

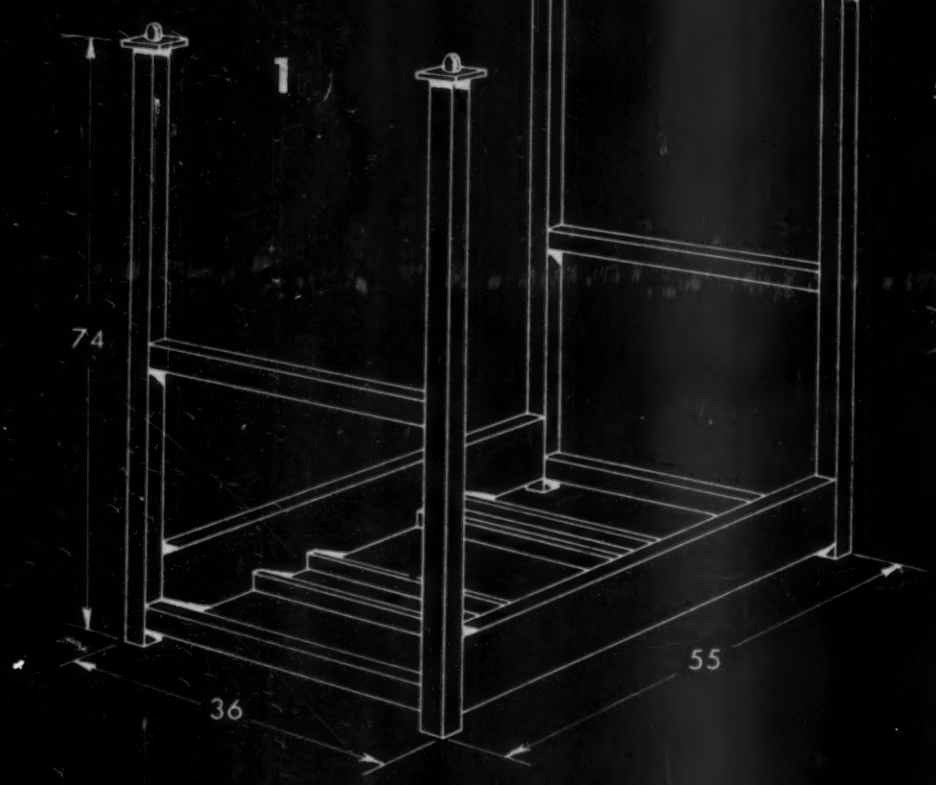
Previously, the irregular shapes and odd-sizes of parts in the plant precluded any thought of vertical tiering; all storage was at the ground level. There were many individual handlings between receipt and final assembly, and, in addition, parts frequently sustained costly damage.

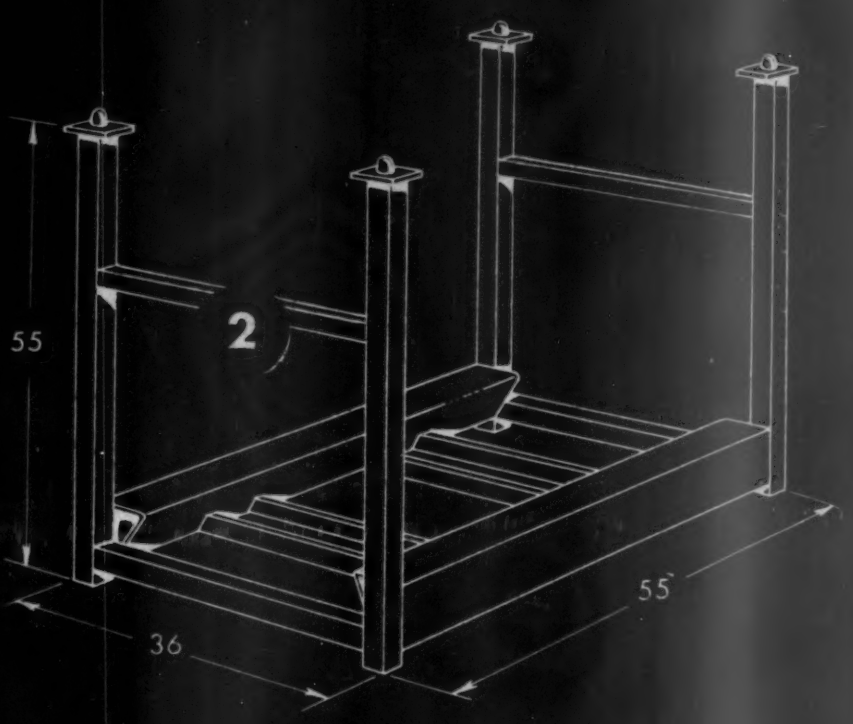
Now parts received from vendors are unloaded directly into the proper container and remain there until used on the assembly line. Parts machined or fabricated at the mile-distant original plant are put into the proper container at that plant, trucked to the new plant, and either placed in storage or sent directly to the line.

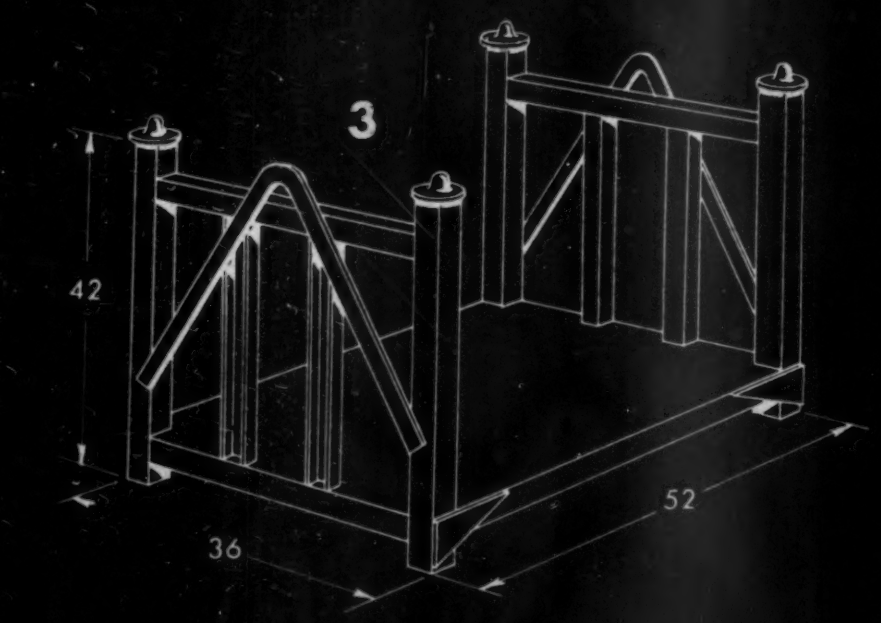
Each of the seven containers was designed to permit tiering to predetermined heights, and was built to allow for handling by fork-lift

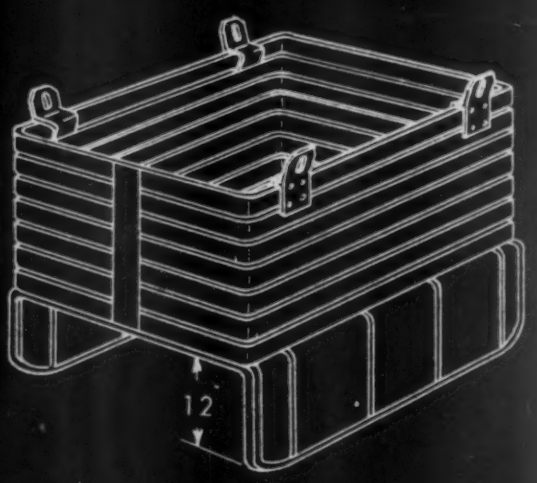


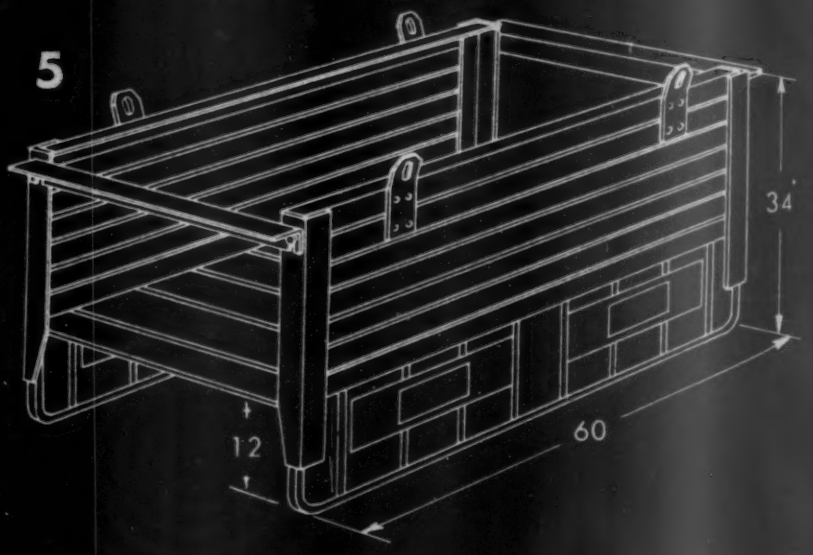
Skid boxes and large carriers multiply yard storage space several times by making easy tiering of articles which normally can be handled only at ground or near-ground levels. Lugs atop posts prevent slipping







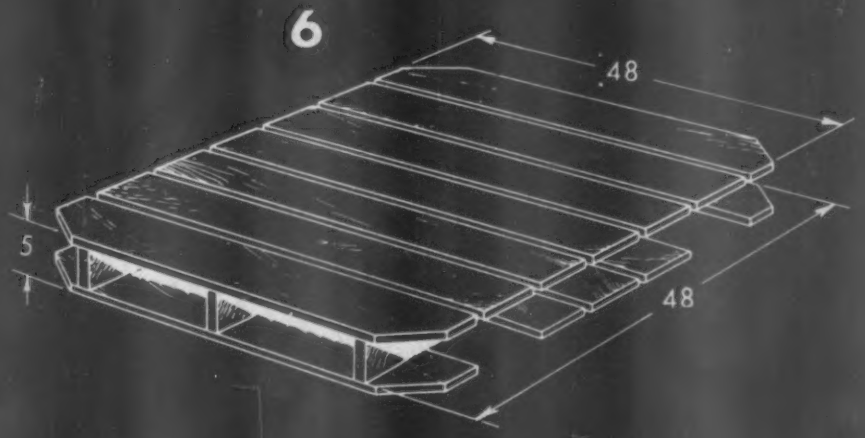


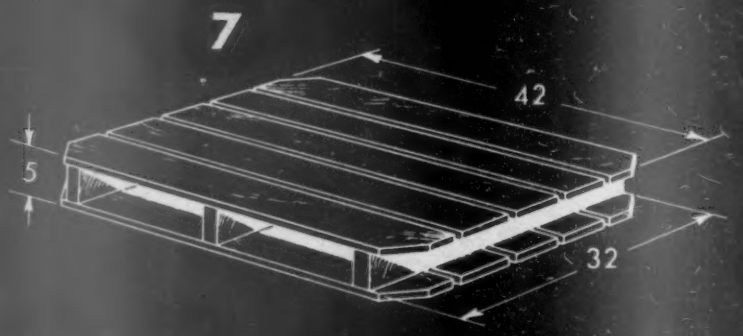


truck, hand-lift trucks and various types of cranes and hoists.

Basic skid box. (Figure 1). Nucleus of the container group is the corrugated steel skid bin used for castings, machined parts, and fabricated items which must be handled in loose form. It is equipped with tiering lugs and attachments for crane handling. The underclearance for fork trucks was specified at 12 inches to allow for removal of parts without the necessity for detiering, and to allow for handling the boxes

	TYPE OR CONTAINER	MATERIAL STORED IN	CAPACITY	TIERS	HOW HANDLED
1	**LARGE CARRIER**	Rough castings Small and medium machined parts Material too large to be stocked in shelving	4000 lb. 4000 lb. 4000 lb.	5	Fork lift truck Crane Hand truck
2	**MEDIUM CARRIER**	Steering gear Batteries Front axle beam Drive line Body cross members	10 15 6 25 15	5	Fork lift truck Crane Hand truck
3	**SMALL CARRIER**	51- to 68-inch OD tires Dash Hood	2-3 5 10	3	Fork lift truck Crane
4	**CORRUGATED SKID BOX**	48- to 50-inch OD tires Rim flanges Floor plate Gas tank (large) Transmissions	3 50 20 4 4	4	Fork lift truck Crane
5	**OPEN END SKID BOX**	Fenders Small air tanks Seat cushions Drivers' seats Hoodside	10 25 20 4 30	5	Fork lift truck
6	**LARGE PALLET**	Rear wheels Brake drum Rear axle housing Radiator assembly Wheel rims	4 25 4 6 8	up to 172 in.	Fork lift truck Crane (sling) Hand truck
7	**SMALL PALLET**	Hydraulic pistons Rubber bushings (large) Material in cardboard containers Steps Rectangular oil tanks	24 20 4000 lb. 25 9	up to 172 in.	Fork lift truck Crane (sling)





individually (during fabrication) with a power-driven hand truck.

Open-end box. (Figure 2). A corrugated steel open-end skid box is designed to store items less than 32 inches wide and up to 9 feet long. In addition to being a little longer than the previous type, it is without end walls. Rigidity is obtained by tie bars—one at each end—which are hinged to one side of the container and may be locked to the other. Its construction permits this carrier to be picked up by lift truck either

from the ends or from the sides, the latter being necessary when long loads overhang the ends.

Frame-type carriers. (Figures 3, 4, 5). Bulky and odd-shaped items are handled—and tiered—conveniently in one of the three frame-type carriers, which roughly resemble four-poster beds. Lugs atop each of the posts permit the carriers to be stacked one upon another without danger of slipping. The three sizes of this carrier are distinguished mainly by the differences in height, although there are minor variances in construction details. Thus, on the largest carrier one of the long, narrow supports is hinged, permitting it to fall outward and form a convenient ramp for rolling giant tires on and off. Similarly, the engineers who designed the carriers found that most of the items which would normally be handled in the small carrier could be better accommodated if this size had a solid, flat bottom.

Pallets. (Figures 6,7). Two stevedore-type pallets are 48x48 and 42x30 inches, respectively. Like all the other carriers, they were designed to give the best service for the particular shapes and weights of materials handled at Euclid.

Though not a container as such, a specially designed permanent rack for the storage of 3000-lb. diesel engines has proved to be an invaluable space saver. In the old plant, storage of these engines was two high, the engine on the floor being straddled by wooden horses which supported a second engine on top. The new rack provides for four-high storage.

Engines are received from the vendor on a cradle which has fork-truck entry spaces at the base. In position in the rack, these cradles rest on 14-in. shelves which extend out from the sides. There is sufficient clearance between the top of the engine and the cradle above to make it unnecessary to remove the engines in vertically descending order.

Shelf Height Varies

An unusual feature of this rack is that the height between shelves increases as the angle of vision of the operator varies from normal. This compensates for the poor visibility that would normally be expected when the operator must insert the forks of his lift truck in one of the higher cradles.

Another major consideration involved in trebling capacity was *where* to store. A supply of large parts that are unaffected by weather is maintained in a concrete yard adjoining the building. Five aisles divide the area into storage spaces 25 feet wide, with 13-ft. aisles adjacent to the building and at the farthest edge of the yard.

Temporary storage of these large items is in a bay near the assembly line. A quantity sufficient for one day's production is stored here, and is replenished from the yard only on orders of the production stores department.

Small items are held in a stockroom adjacent to the assembly line, and are dispensed from this point. Permanent storage of these items—in or on the various containers and carriers previously described—is on a mezzanine immediately above the storeroom. Vertical space is thus utilized to the fullest possible extent, and the time and effort of transfer from permanent to temporary storage is held to a minimum.

Four-high storage of 3000-lb. diesel engines is no trick at all in this special rack. Shipping cradles rest on shelves, allow loading and unloading without regard for vertical position

LESS LABOR TURNOVER—BECAUSE APPLICANT PREVIEWS JOB

ROBERT YOUNG • PERSONNEL DIRECTOR, VICTOR MANUFACTURING & GASKET COMPANY, CHICAGO

Hiring is a two-way process at Victor. First, management looks at the applicant. Second, the prospective employee looks at the job. Result—labor turnover has been cut from 10 per cent to 4 per cent a month—a reduction of 60 per cent.

Under this "job introduction" plan, the applicant is first interviewed in the employment department and a decision is made as to his acceptability to the company. No matter what job the individual is applying for, he is introduced to the department foreman by one of the employment clerks. The foreman then takes the applicant around the department, explains the various work being done, and tells him the exact nature of his own particular work. In this way, the foreman is in essence selling the job to the applicant. When the future employee is returned to the employment department for final interview, he has a good idea of where and what his work will be, and whether he will like it.

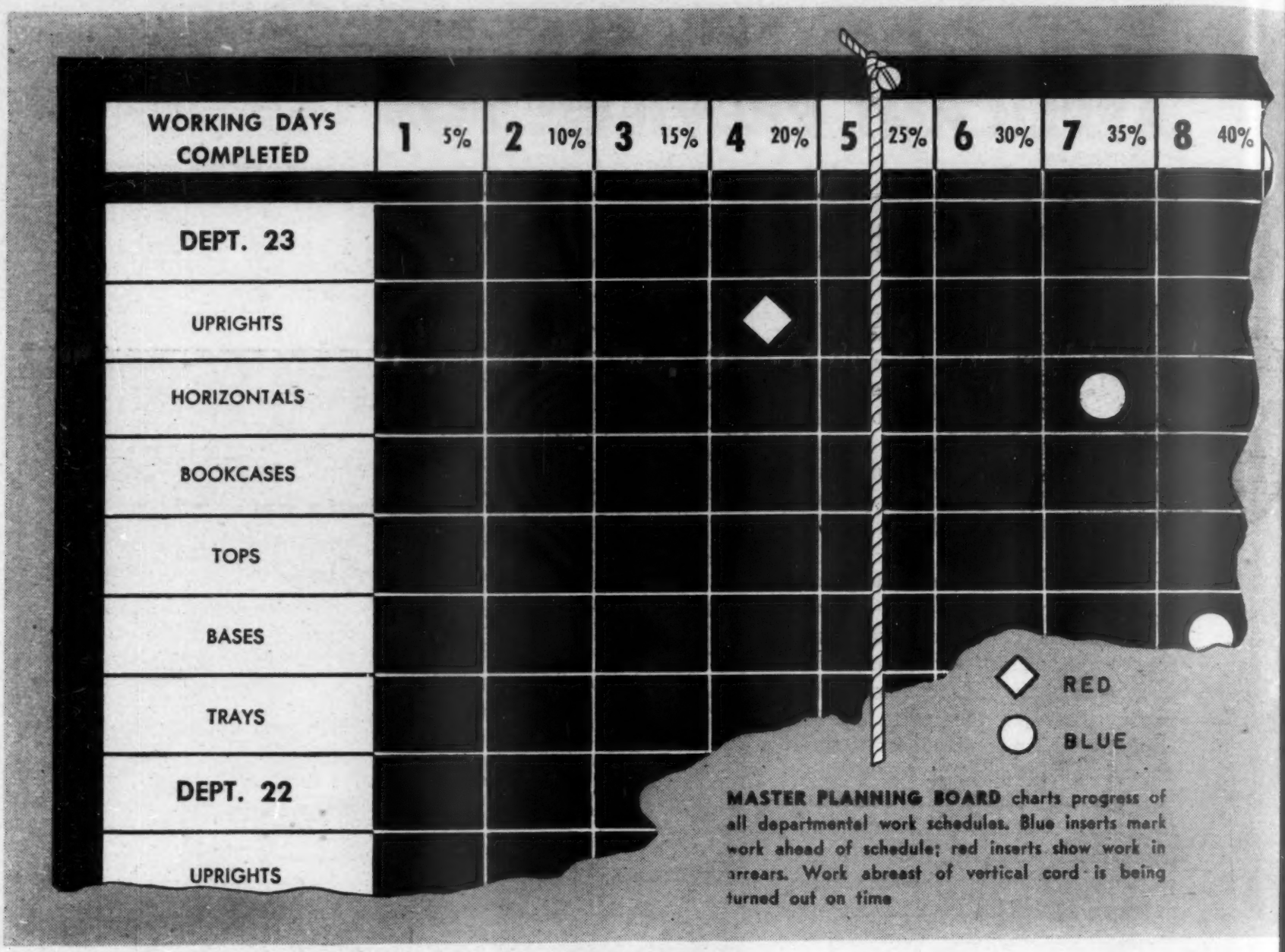
A Mutual "Sizing Up"

This method gives the foreman an opportunity to evaluate the applicant and the applicant a chance to size up his future job. The net effect is to increase efficiency and reduce labor turnover.

This hiring plan takes more time than ordinary hiring procedures on the part of the employment department and the various foremen involved. However, the additional expense and time have been more than justified by a sizable reduction in new employee training expense, better supervisory-employee relations, improved production efficiency, and a more stable, as well as a more contented, working force.

FIRST, THE APPLICANT IS INTERVIEWED . . .

. . . THEN SHE "INTERVIEWS" THE JOB



MASTER PLANNING BOARD charts progress of all departmental work schedules. Blue inserts mark work ahead of schedule; red inserts show work in arrears. Work abreast of vertical cord is being turned out on time

DECENTRALIZED PRODUCTION CONTROL AT 25 PER CENT SAVING

MELVIN V. HAAS • PRODUCTION CONTROL MANAGER, THE GLOBE WERNICKE COMPANY, CINCINNATI

Production control has been decentralized at Globe-Wernicke. In each of three divisions—wood, steel, and paper—coordinated systems have been installed.

Centralized control just didn't fill the bill for our problems. In practice, it required too great an over-all knowledge of the products and phases of manufacture of the three divisions.

That the change has been good for us is shown by these advantages:

1. Cost reduction of 25 per cent for production control functions.

2. Reduction in forms amounting to 30 per cent.

3. Speeding up of all orders.

4. Shortening the time to train production control personnel.

5. Elimination of all expediters. It is now possible to get information from the man best suited to give it—the foreman.

In addition, a narrower scope of operations enables the production control worker to gain a more thorough knowledge of the requirements and problems of his division.

The main problem was the coordination of the three divisions. Since each makes products for the

others, and since an order placed for any one of the three types of office equipment must receive equal consideration, a well-integrated interdivision ordering system was essential. That need has been met by the new system.

For example, when the wood division needs steel parts for any of its final assemblies, a stores requisition is sent to the steel department, where a perpetual inventory card shows the current stock level. The wood division's requisition is entered on the inventory card, and the amount of stock on hand is checked against the minimum. If the order will reduce the amount on hand below the minimum, the steel division initiates a stock order for a new production run. This procedure is the same in the wood and paper divisions.

If a stock order is held up, the division initiating the order is notified so that it may adjust its schedules accordingly. When the division producing the parts is able to reschedule them, a new date for completion is sent to the division requesting the stock.

Planning the Work

The most important function of each production office is planning and scheduling the department's work. Therefore, maximum standards, based on a study of machine loads and manpower productive capacity, have been established for the processing of various parts in each department.

A thorough analysis of all work in process in each department, as well as the total backlog of orders not yet in process, must be available on short notice if planning is to be intelligent and economical. In order to lay out a schedule procedure, it was necessary to set up:

1. Desired production units—desks, bookcases, or cabinets.

2. Items comprising these units and amount of the items not in process.

3. Items comprising these units and amounts in process.

This breakdown reveals any unbalanced condition of coordinated units, such as bookcases or desks;

STORES REQUISITIONS

TO DEPT. 22 — FROM STORES DEPT. 68-Steel — FOR ORDER NO. — DATE ISSUED — DATE DELIVERED

QUANTITY	SYMBOL	DESCRIPTION	UNIT	STANDARD PRICE	STANDARD VALUE	ACTUAL PRICE	ACTUAL VALUE
1000	45626	Steel housing					
QUANTITY	SYMBOL	BALANCE ON HAND 6000 NAME OF PART FOR WHICH MATERIAL IS REQUIRED					
WRITTEN BY M Haas		RECEIVED BY Foreman		TOTAL			

STORES REQUISITIONS allow coordination of work schedules in three divisions under decentralized production control by enabling one division to order supplies from others

STOCK CONTROL REPORT

DATE 1/30

ITEM	SALES J F M A M J J A S O N D	MERCHANDISE ON HAND	MERCHANDISE ON ORDER	WHITE ON HAND	WHITE ON ORDER	PREVIOUS RUN	QUAN. PIECE PART	AUTHORIZED QUAN.
3312 Bkcase	14 ✓ 28	(690)			600	300		
3317 Bkcase	61 37 ✓ 33	(371)						

STOCK CONTROL REPORTS tell production manager which items are critical, what past sales have been made, size of previous runs, and other data pertinent to planning

MERCHANDISE ORDERS, based on analysis of stock control report, summarize essential information—include quantity, routing to departments, and completion dates

MERCHANDISE ORDER NO. 3088I-D

QUANTITY	PATTERN NO.	DESCRIPTION	GRADE OR FINISH
20	3317	SD (Requires 120 files)	Gum

ON HAND | MO. SALES | DATE WANTED

BILL OF MATERIAL

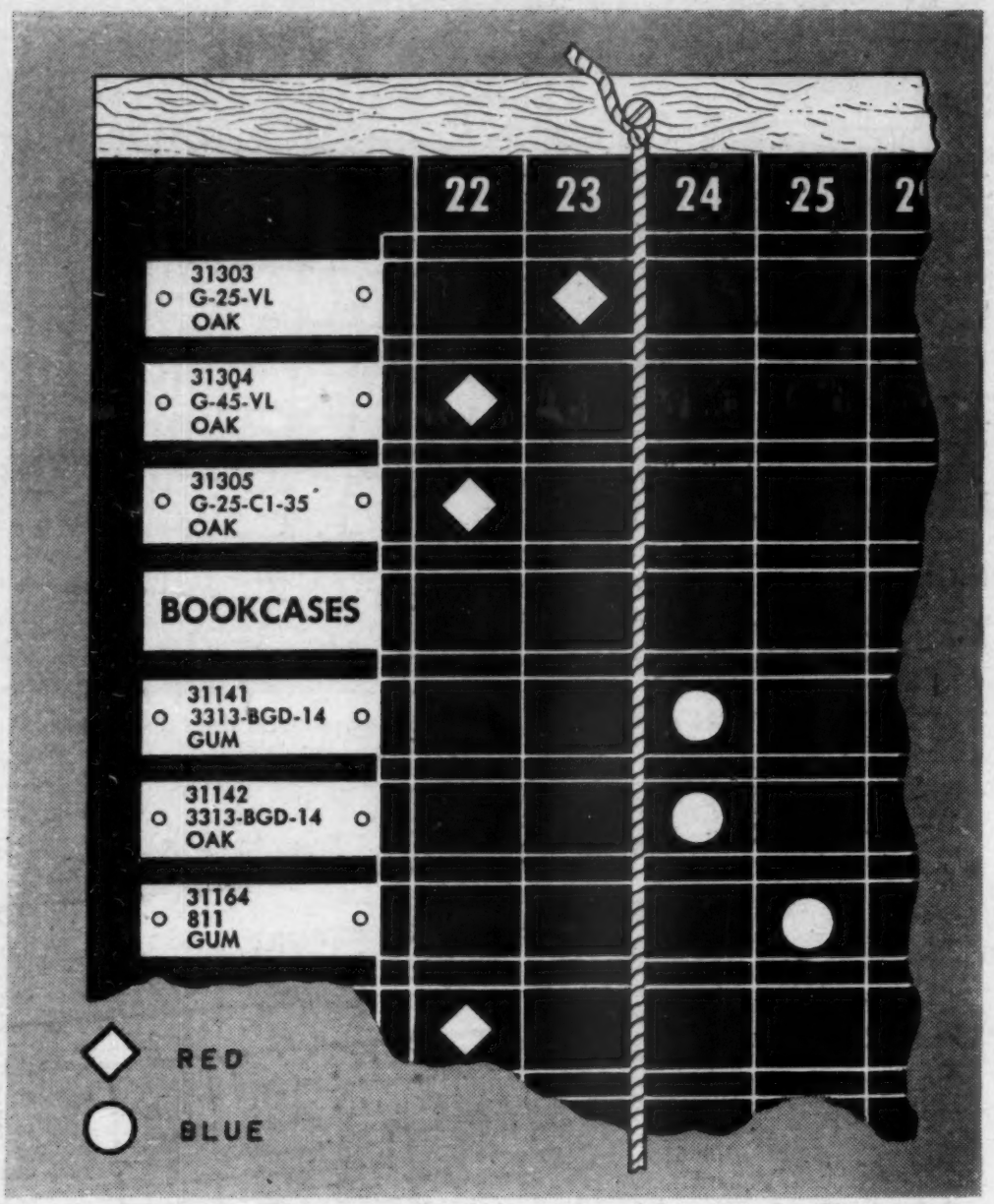
	DESCRIPTION

ROUTE TO DEPARTMENTS

DEPARTMENT	23	22	25	24	29	26	28	Mel Haas
DATE IN								

DATE WRITTEN — WRITTEN BY — APPROVED BY

QUANTITY	PATTERN NO.	DESCRIPTION	GRADE OR FINISH	FACTORY ORDER NO.
				3088I-D



ORDER SCHEDULE BOARD shows product, order number, and process sequence by department. Blue tacks and red tacks indicate respectively whether orders are on or off schedule

if a department is overstocked or understocked, the schedule is adjusted accordingly. Taking into consideration the orders in process and on backlog, the maximum amounts limited by the man-hours and machine loads can be broken down by order and scheduled for each department.

This contemplated schedule is then tied in with a master planning board, which is used as an over-all check on the monthly schedule. All departments and their products are listed on the board. There are columns for 21 working days, each representing approximately 5 per cent of the monthly scheduled output.

A cord stretched from top to bottom of the board can be moved from column to column to designate the current working day. Products listed on the daily output record are checked for their percentage of completion against the monthly schedule. Blue inserts are placed ahead of the cord for products ahead of schedule; red inserts behind the cord for those not on schedule. No inserts are used for products being turned out on time.

To keep tabs on the schedule status of the orders in each department, an order schedule board is maintained. This board shows the product, the order numbers, and process sequences by departments. A blue tack is moved on the board as orders progress from one department to another. A red tack is immediately substituted when processing lags.

Foremen fight to keep red tacks from showing up under their departments. It is an indication—unless the entire department is behind schedule—that they have had the opportunity, but have failed to provide for the order's scheduled production. If the department as a whole is off schedule, the appearance of a large number of red tacks is to be expected, and simply indicates that the over-all schedule should be re-examined to determine and correct causes of the delay

Scheduling Production

Production scheduling is carried out on a similar pattern in all three divisions. The division production manager analyzes reports of the material on hand and on order, also the size of the last run, and sales figures for preceding months.

He then makes out a merchandise order for the production of any required number of items. The order form carries the routing for manufacture, an order number, and a schedule date for each department through which it is routed. Bills of material and blueprints are attached; then the order is released to the manufacturing departments.

As each department completes an order, appropriate data are listed on a daily output report, which is sent to the production office. When the daily output report from the final processing department shows the completion of a production run, the finished stock totals are posted to stock record. Sales tickets are released from the stock record cards, and a release form is issued to authorize packaging and shipment.

THE AMERICAN WAY

The lower the production cost of industry's products, the lower the selling price can be. Low selling prices stimulate widespread purchasing, which calls for large orders, which provide extensive employment

CASES IN WORK SIMPLIFICATION

The engineers at Casco Products Corporation, Bridgeport, Conn., claim that there is an easier and a better way to do every job. To back up that claim, E. H. Lockwood, engineering manager, opened his files to FACTORY's visiting editor. A trip through the plant proved what his files indicated, that "better ways" are indeed being found—and installed—at Casco.

FACTORY invites you to accompany its editor and photographer as they tour Casco departments to obtain documentary evidence of just seven of the many methods improvements now marked "completed" in the company's file.

IMPROVEMENT NEEDED: Rejects could be cut by raising temperature of plastic handles to about 115 deg. F. before inserting metallic elements into them.

CORRECTIVE ACTION: ➔ Construct wooden box around bottom-feed hopper. Replace slanting, sheet-metal bottom of hopper with wire screen. Place heating coil and fan beneath hopper. Provide air intake at bottom-rear of box, outlet at top-front. Equip with automatic signaling thermostat.

IMPROVEMENT NEEDED: Operation time high on making loops in armature leads. Too many rejects result from lack of uniformity.

CORRECTIVE ACTION ➔ Twist wire loop with fishtail-shaped hand tool. Groove tip of tool to hold wires in position. Split fishtail laterally, keep parts separated with coil spring; compressing spring permits insertion of fishtail into loop. Natural action of spring maintains constant tension in wire while loop is formed by giving tool one full twist. Compressing spring again permits removal of tool.

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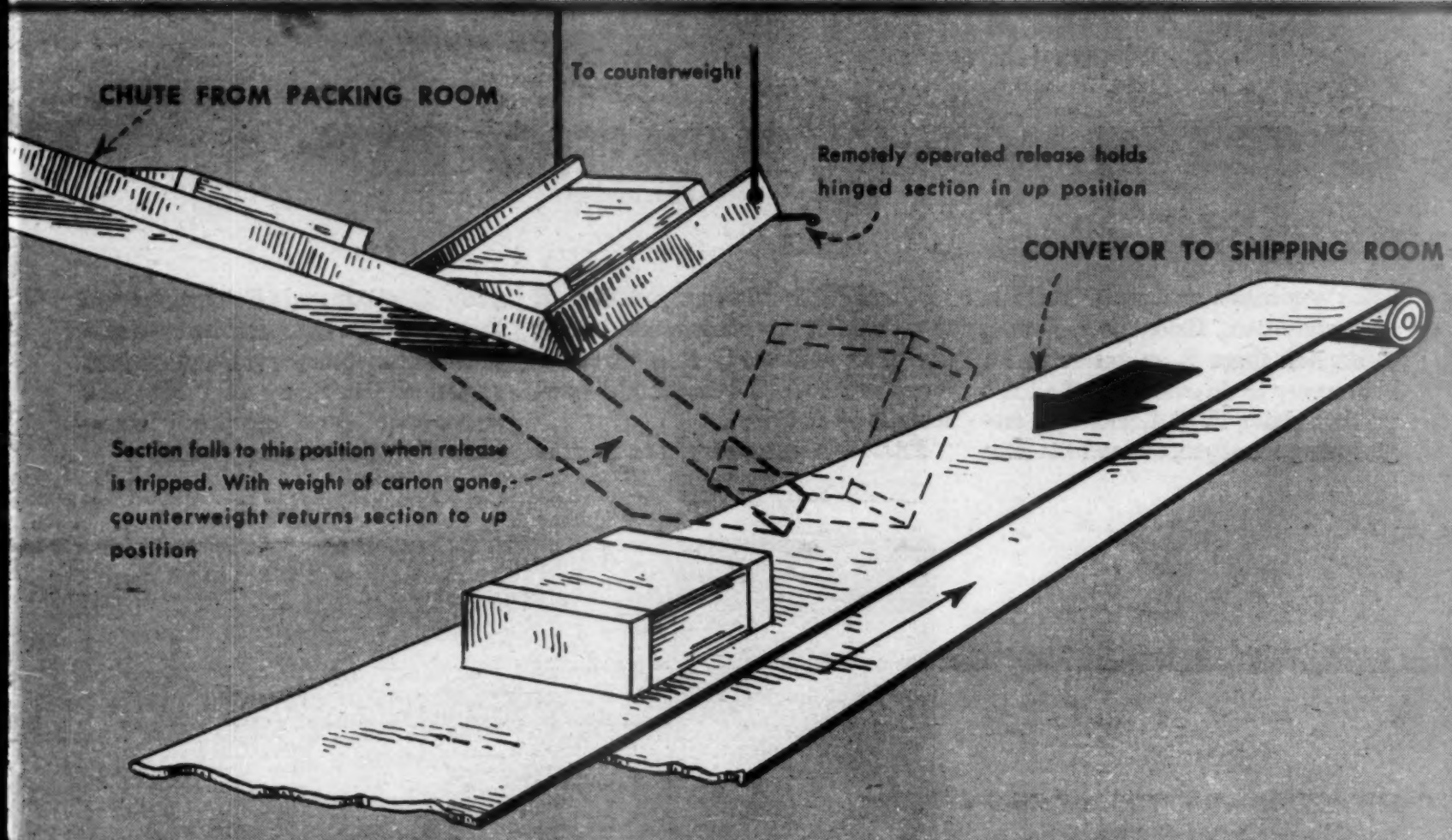
CHUTE FROM PACKING ROOM
To counterweight
Remotely operated release holds hinged section in up position
CONVEYOR TO SHIPPING ROOM
Section falls to this position when release is tripped. With weight of carton gone, counterweight returns section to up position

IMPROVEMENT NEEDED: Cartons of heating pads are being hand trucked from packing room to shipping. A conveyor is indicated, but space it at a premium.

CORRECTIVE ACTION: Conveyor from other building to shipping room passes directly beneath pad packing room. Cartons can be fed from the packing table directly onto this conveyor by means of a chute. To prevent pile-ups, pivot end section of chute and counterweight it. Signaling device in packing room tells dispatcher if conveyor is clear to receive cartons. If so, he can release counterweight, permitting carton to drop onto conveyor.

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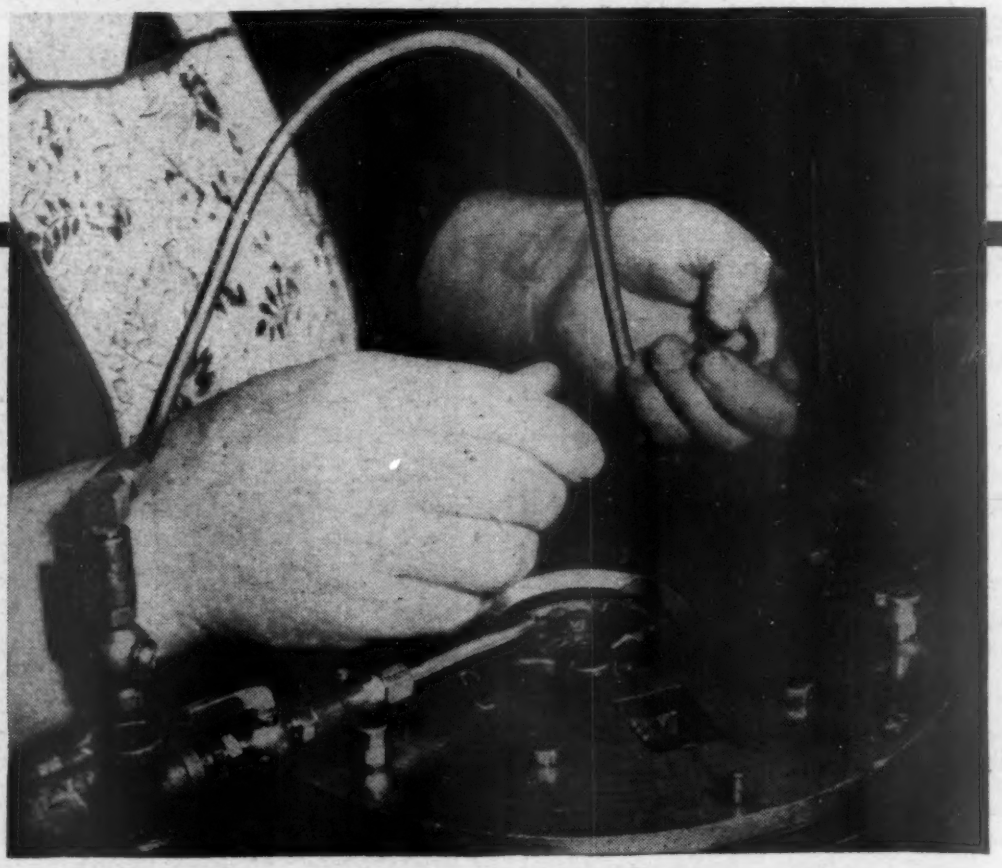
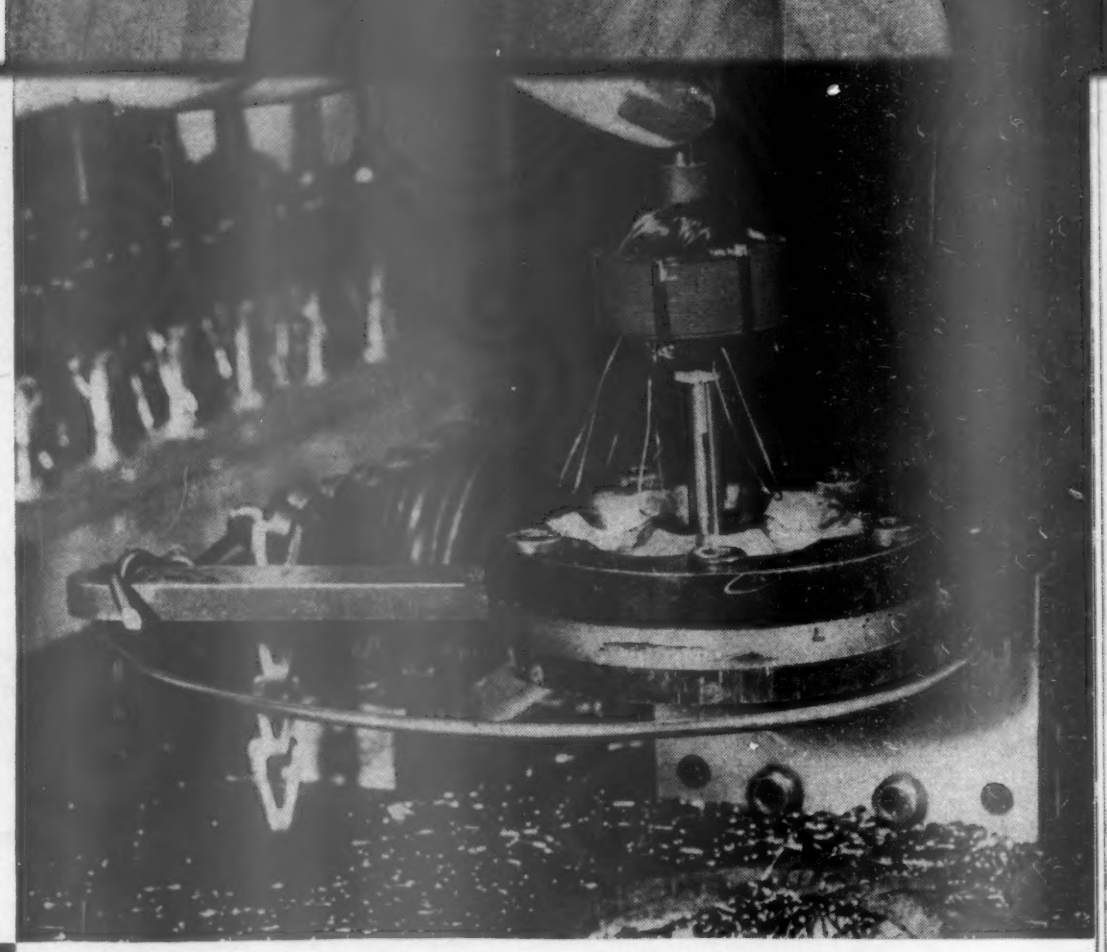


IMPROVEMENT NEEDED: Removing punched lighter brackets from side-stamping press is slow and awkward; sometimes results in cut fingers from sharp edges.

CORRECTIVE ACTION: ➔ Arrange two air jets as shown in photograph. One directed downward blows small pieces into scrap tray. Horizontal jet blows bracket into funnel to totepan when it is raised from press on completion of operation.

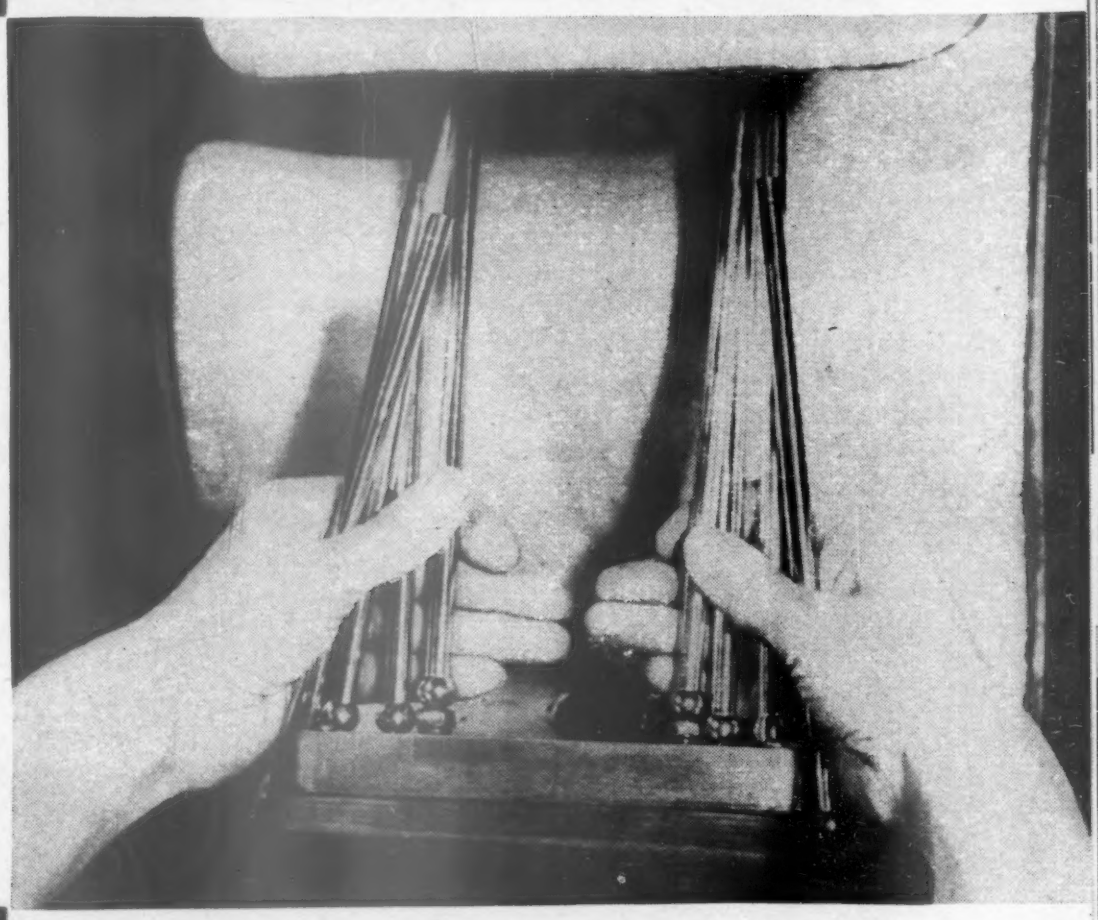
IMPROVEMENT NEEDED: Clipping armature leads troublesome to operators. Separation of loops for individual clipping is awkward on small piece. Difficult to achieve uniform length of clipped leads.

CORRECTIVE ACTION: ➔Make clipper with one stationary, one rotating blade. Cut seven positioning holes in the fixed (top) element. Loops inserted through these holes are clipped to uniform length when the lower blade is rotated by pressing a foot pedal.



IMPROVEMENT NEEDED: Cleaning and lubricating interior of rods carrying electrical connections to automobile fender lights. Present method slow and not always 100 per cent effective.

CORRECTIVE ACTION: ➔Mount a pair of air jets in the workplace, beneath an exhaust hood. Place tubular rods successively over first one and then the other of these jets. Trip start-stop mechanism with spring so that compressed air is released only when rods are in position. Arrange for two-hand operation, left jet to blow hot, dry air, right jet to spray interior of tube with atomized oil.



IMPROVEMENT NEEDED: Stacking armature laminations is slow and cumbersome; operation seems to be unnecessary.

CORRECTIVE ACTION: ➔Stack laminations automatically as they come from the punch press. Two rods positioned to fit the holes in the laminations can be attached directly to the punch press. As the laminations are ejected, they are collected and stacked automatically on the rods.

WHAT THE NEW LABOR LAW MEANS

GERARD D. REILLY • FORMER MEMBER, NATIONAL LABOR RELATIONS BOARD; SPECIAL COUNSEL, SENATE COMMITTEE ON LABOR AND PUBLIC WELFARE

Few men could be better qualified than Gerard D. Reilly to tell FACTORY's readers what the "Taft-Hartley" Labor Management Relations Act of 1947 *does* and *does not* mean. . . . The bitter propaganda of recent months has left many dangerous misconceptions in its wake. The editors have indicated in boldface type in this article the statements which they believe will serve to revise those mistaken impressions

Final enactment of the Taft-Hartley Act means that for the first time since 1932, when the Norris-LaGuardia Act was passed, employers are afforded some remedy under federal law for certain kinds of union conduct, which, by common consent, have always been deemed contrary to sound labor-management relations. **It does not mean that the basic principles of the National Labor Relations Act have ceased to be law.** The institution of collective bargaining itself, with the unfair labor practice rules designed by the Wagner Act for its protection, has been left virtually unchanged.

However, the new statute should afford considerable protection to the public, to individual workers, and to employers since it places upon the officials of organized labor obligations and responsibilities commensurate with the remarkable growth and power of unions in the United States. It has the double objective of restoring equilibrium in bargaining relations and making union leadership more responsive to the wishes of rank-and-file employees. To the extent that the legislation attains either of these objectives, it should promote industrial peace. **It contains no provisions which specifically prohibit union members from engaging in primary strikes against their own employers to better their wages or other working conditions.**

No attempt will be made here to describe or appraise the numerous procedural reforms set forth in the Act. While such matters are of great importance, management officials having industrial relations duties will be primarily concerned with those provisions of the Act which have an immediate impact upon the day-to-day work of contract negotiation and the handling of grievance procedures.

Supervisors

The new statute deals with the issue of supervisory personnel in clear and unequivocal fashion. It excludes from the definition of "employee" in the Wagner Act all supervisors authorized "to hire, transfer, suspend, lay off, recall, promote, discharge, assign, reward or discipline other employees, or responsibility to direct them or to adjust their grievances, or *effectively* to recommend such action" (italics added). In essence, this was a test the Board itself used for years in distinguishing between the *bona*

Harris & Ewing

● Gerard Denis Reilly, who wrote this analysis exclusively for FACTORY, was a key figure in the drafting of the "Taft-Hartley" Bill, now the Labor Management Relations Act of 1947. Before he had any knowledge of his forthcoming duties as Special Counsel to the Labor Committee, Reilly gave FACTORY's readers a surprisingly accurate preview of the new Act, in another signed, exclusive article ("Here's How I'd Change Our Labor Laws," FACTORY, November, 1946).

A lawyer by profession, Reilly has served with distinction in many government posts in the field of labor and labor relations.

fide supervisor and such straw bosses as lead men, set-up men, checkers, and expeditors. In this respect the Act leaves foremen in the same position in which they were until the Labor Board reversed the position it had taken in 1943. It overrules not only the *Packard* case, but also the *Soss* case, which held that if a company discharged foremen to discourage them from joining a labor organization, it was an unfair labor practice. Under the new Act an employer can insist upon the undivided loyalty of his supervisory staff and can, without violating the law, lay off, discharge, or demote a supervisor who engages in union activities.

Although the new Act does not specifically exclude personnel men, labor advisers, employment officers, and other confidential employees from the coverage of the Wagner Act, it was the intent of Congress that the Board should not extend the protection of the Act to them. In the statement of the House conference managers, the Board's present practice in excluding such personnel is expressly approved.

In the interests of assuring complete freedom of choice to employees who do not wish to be represented collectively as well as those who do, it requires the Board to enlarge the rights of petition in representation cases and to give greater attention to the special problems of craftsmen and professional employees in the determination of bargaining units. Professional employees (including engineers, scientists, and nurses) are no longer to be submerged in production or general office units, since Section 9(b), as revised, gives them a voting unit of their own for the purpose of selecting bargaining representatives. **And, unions purporting to represent plant guards no longer can invoke the Wagner Act to secure recognition, if such unions admit to membership persons other than guards, or are affiliated with AFL or CIO.**

Compulsory Union Membership

There are provisions in the Act which make it illegal to accede to certain requests that labor organizations frequently make at the bar-

MAJOR LABOR LAW CHANGES

1. SUPERVISORS can no longer force recognition of their unions, and may be discharged for any union activity

2. PLANT GUARDS may belong only to unions limited to guards, and these unions may not be affiliated with any union of production workers

3. CLOSED-SHOP CONTRACTS are outlawed at expiration of present contract or one year from date of Act, whichever is later

4. UNION-SHOP AND MAINTENANCE-OF-MEMBERSHIP CONTRACTS are permitted only if approved by a majority of all employees in the unit; effective dates same as closed shop. Members may still be expelled by union, but may be discharged only if expulsion is for failure to pay dues or initiation fees

5. CHECK-OFF remains legal, but only if authorized in writing by the employee

6. WELFARE FUNDS must be jointly administered; minor limitations on their use are prescribed

7. CONTRACT TERMINATION now requires written notice 60 days in advance. Failure to comply constitutes a "refusal to bargain"

8. CONCESSIONS are not required as evidence of "good faith" in collective bargaining. *But* neither are unions required to recede from their demands

9. STRIKES IN VIOLATION OF CONTRACT are grounds for actions to recover damages in federal courts from union treasury, but not from individuals

10. GRIEVANCES may be settled with individual employees; union representative need be present only at *final* adjustment. However, settlement must be consistent with terms of contract

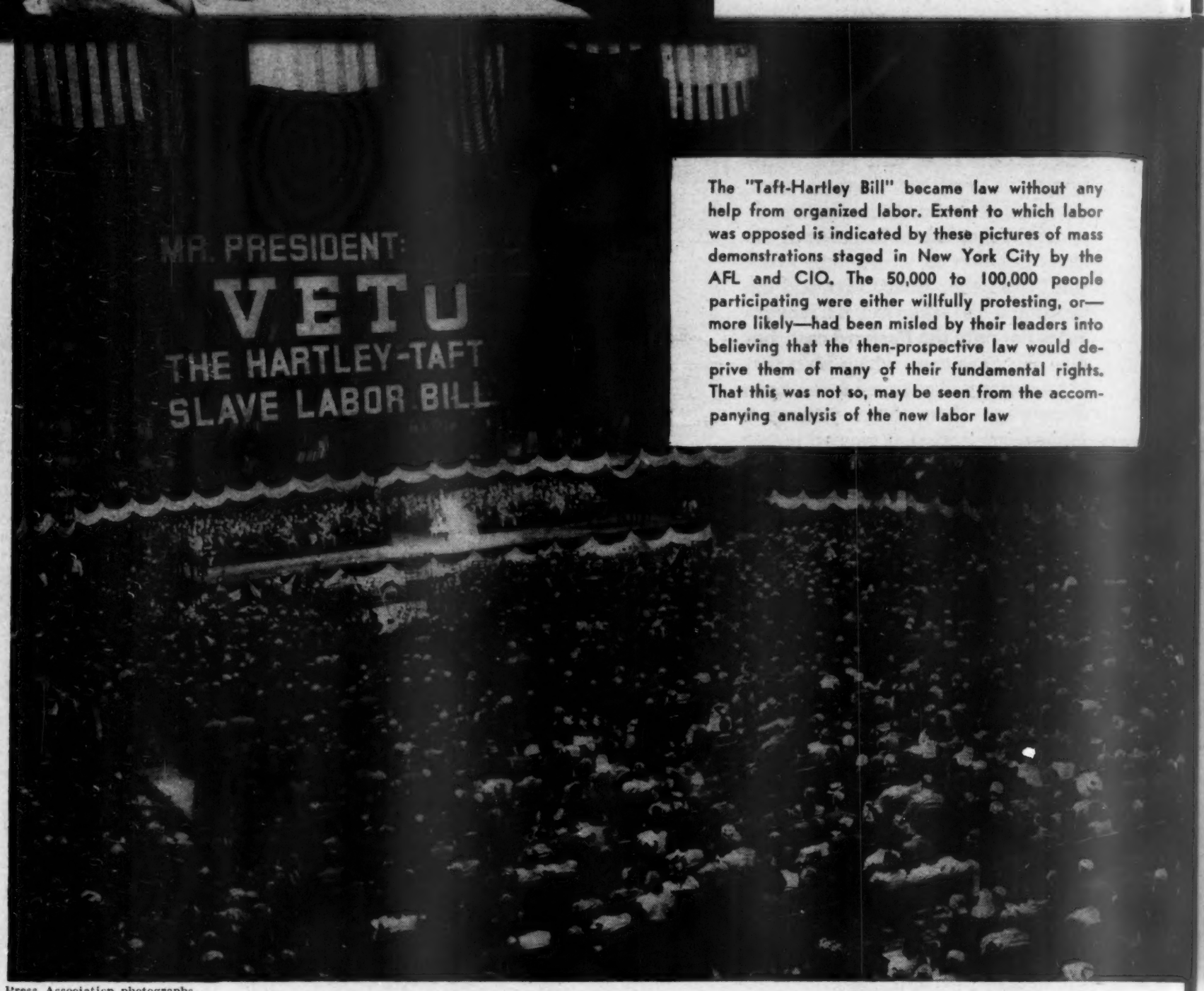
11. "COMPANY UNIONS" are still suspect. *There are no changes in Wagner Act section dealing with company unions.* Another section, however, directs the NLRB to accord independent and affiliated unions similar treatment when circumstances are same

12. RIGHT OF FREE SPEECH for management is broadened, but there still are limits. "Views, arguments, opinions" are okay; instructions or directions probably not

13. STRIKES FOR RECOGNITION have *not* been outlawed, but an employer served with a demand for recognition may petition NLRB for an election

14. JURISDICTIONAL STRIKES become an unfair labor practice by unions; may be restrained by injunction if NLRB requests. Unions liable for damages in federal court

15. SECONDARY BOYCOTTS, of certain types, are outlawed. Such practices may be restrained by injunction by NLRB, and the union may be sued for resulting damages



The "Taft-Hartley Bill" became law without any help from organized labor. Extent to which labor was opposed is indicated by these pictures of mass demonstrations staged in New York City by the AFL and CIO. The 50,000 to 100,000 people participating were either willfully protesting, or—more likely—had been misled by their leaders into believing that the then-prospective law would deprive them of many of their fundamental rights. That this was not so, may be seen from the accompanying analysis of the new labor law

Press Association photographs

gaining table. New agreements executed 60 days or more after the effective date of the Act may not contain any enforceable provisions making union membership a condition of employment *unless certain formalities are complied with.* A clause requiring all employees to be or to become members upon the date they are hired or, if they are already employed, the effective date of the agreement, is void. This is the result of the amendment to sub-section 8(a)(3), abolishing the so-called closed shop. An employer can still agree to a provision for a union shop (after the 30-day period of grace) or maintenance of membership, provided the union has been authorized to negotiate such an agreement by a majority of the employees in the bargaining unit it represents. To obtain such an authorization the union must ask the Labor Board to conduct an election.

It should be observed that in these "compulsory membership" elections the new law specifies that the test of "majority" must be based upon the entire number of employees in the voting unit Thus, the new Act makes a distinction between these referenda and representation elections.

As to the latter, no change has been made in the language of the Wagner Act requiring unions, before certification, to obtain the vote of a "majority of the employees in a unit." NLRB has interpreted this to mean a majority of those voting and no doubt will continue to do so. Congress did not intend any change on this point.

One important aspect of this procedure which negotiators would be well advised to consider, is that it will probably not promote harmonious relations in the long run if a labor organization, after making a union shop demand, is simply told to go to the Labor Board—unless the company representatives really mean to accept such a provision. Employers should be candid about their attitude on compulsory membership at the threshold of negotiations. Otherwise, if a union obtains authorization from the employees to seek a union shop at the suggestion of an employer who has no intention of granting it, not only the shop committee but also a majority of the employees may think they have been double-crossed. The likelihood of a strike under such circumstances can be readily envisaged. Of course, if a union obtains a referendum without any employer encouragement, there is a different situation.

Existing agreements respecting any form of compulsory membership (closed shop, union shop, guild shop, or maintenance of membership) are enforceable under their terms until the termination date of the contract, but such agreements executed after the enactment date, but within the 60-day period, cease to be enforceable after a year.

All new agreements, even though requisite authorization is given by the employees, moreover, are not enforceable with respect to em-

ployees who were denied admittance to a union or expelled for some reason other than the failure to tender the dues and initiation fees *uniformly* required. This provision was written into the law in order to prevent the dominant union clique from ousting from their jobs members who belong to some insurgent faction or are engaged in some other conduct that the union does not like.

The law does nothing to hinder a union from expelling employees from membership. It does make it an unfair labor practice for an employer to yield to union pressure and discharge such employees, and also an unfair labor practice for the union to cause or attempt to cause the discharge of expelled members under such circumstances.

Check-Off

Employers can still agree to the check-off of union dues, but such dues may not be deducted from the accounts of individual employees unless the employer is furnished a voluntary written assignment by the employee affected.

This limitation on the deductibility of union dues does not affect existing contracts until July 1, 1948, but it becomes immediately operative with regard to all new contracts. The reason for this is that the provisions with regard to the check-off are contained in Section 302 (c) (4), which is a part of Title III, effective on the date the bill became law. This title does not contain the 60-day clause with respect to the effective date of Title I (the portion of the bill amending the National Labor Relations Act).

Welfare Funds

There has been an increasing trend on the part of unions in recent years to ask for employer contributions to welfare funds. Under the Wagner Act there has always been grave doubt as to whether the making of such contributions is not a violation of sub-section 8(2) (relating to financial support of labor organizations) if such funds are to be wholly administered by the union. Section 302 of the new act clarifies this situation by making it unlawful for employers to pay, or unions to accept, money for such purposes unless the instrument creating the fund provides for joint administration by employer and employee representatives. Moreover, the objects for which such funds may be disbursed to the employees are limited to medical or hospital care, pensions on retirement or death, compensation or insurance for injuries, illness, unemployment, accidents or death. **Another restriction is that contributions intended for pensions or retirement annuities must be segregated**—a provision designed to harmonize the new Act with corresponding provisions in the Internal Revenue Code.

Since severe criminal penalties are provided for both unions and

★ **This analysis of the major changes in the country's labor law went to press within 24 hours of the time the Taft-Hartley Bill became law. Because of the many new and fundamental concepts in the law, additional and more detailed interpretations will be needed to give industry a full understanding of its practical effects and implications.**

In the months to come, FACTORY will continue to present analyses of the law until that need has been fulfilled. Supplementing these articles on the law itself, of course, will be up-to-the-minute reports on the application of the law in industry, and on the tests it will undergo in the courts.

After 12 years under the Wagner Act, America has entered a "new era" of collective bargaining. With understanding and cooperation on all sides, this era can be the most fruitful in our history. FACTORY accepts the challenge of presenting to industry—fully and authoritatively—the knowledge on which that understanding and cooperation can and must be built.

employers who violate this section, all parties should bear in mind that **it is immediately effective with respect to trust funds created by new agreements, and also has a limited application to trust funds originally established after January 1, 1946.**

Notice of Termination

Most collective agreements today provide for the parties giving written notice of intent to terminate or modify. While the new law does not require the insertion of such clauses in contracts, an amendment to section 8(5) encourages their inclusion. This is a sub-section which treats as a "refusal to bargain" a contract termination not preceded by a 60-day written notice, irrespective of whether the failure to give such notice operates as an automatic renewal of the contract. **In order to avoid confusion, company and union representatives would do well in drafting future agreements to make express provision for the giving of such notices.**

Duty to Bargain

While the new Act contains a definition of collective bargaining, it alters existing law in only one minor respect, viz., while bargaining in good faith is still required, the refusal to make a concession can no longer be deemed by the Board a breach of this obligation. The most important addition to the law is that the Act makes the duty to bargain bilateral, since it is now an unfair labor practice for a union, if it is the certified or recognized representative, to fail to carry out its obligation to bargain. A common complaint of small companies in recent years has been that the national or international union, after reaching an agreement with two or three of the dominant companies in the industry, attempts to force this pattern upon all competing companies. Unions have been able to accomplish this by submitting "master agreements" to competing employers on a take-it-or-leave-it basis. Under such circumstances, collective bargaining becomes a farce. The new Act would afford some relief to an employer confronted with a union ultimatum of this sort. He could file an unfair labor practice charge, if the union representatives insisted upon pulling a strike without listening to his arguments or counter proposals. How efficacious this remedy will be, remains to be seen, for **the language relieving employers of any implied duty to make concessions applies equally to unions in their capacity as bargaining agents.**

"Personnel" Strikes

The Act forbids one kind of "grievance" strike which has been particularly vexatious to factory managers. These are the "quickies" which are sometimes pulled in order to procure the discharge of a foreman or personnel director who has an altercation with the union. Section 8(b)(1) makes it an unfair labor practice for unions to resort to use of coercive tactics with respect to an employer's selection of "representatives for the purposes of collective bargaining or the adjustment of grievances." Since in most organized plants foremen and personnel men have some authority to act in grievance matters, further strikes of this sort will make unions guilty of an unfair labor practice.

Individual Grievances

The new Act also permits employers to adjust grievances with individual employees *(presumably only in the absence of provisions in collective agreements to the contrary)*. This was implicit in section 9(a) of the Wagner Act, which authorized employees or groups of employees to present grievances to their employer. This right was limited, however, by a decision of the Board requiring the bargaining representative to be consulted at each stage of the grievance procedure irrespective of whether the particular grievance or the particular employee concerned was covered by the agreement. Section 9(a) of the new Act authorizes adjustment of the grievance so long as the bargaining representative has been given an opportunity to be present at the *final* adjustment. **Such adjustments, however, must not be inconsistent with the terms of any effective collective bargaining agreement.**

Contract Violations

Under the new law, employers have greater leverage in insisting that unions resort to the grievance machinery in collective agreements rather than the weapon of the "quickie" strike. For one thing, since the definition of collective bargaining now includes the duty of conferring on questions arising under collective agreements, an employer may obtain an unfair labor practice complaint from the Board against a union which walks out in

preference to conferring upon some disputed point. The Act also permits actions for damages to be brought in the federal courts against unions which violate their agreements. This applies to jurisdictions where the courts have not entertained suits against labor organizations or other unincorporated societies. It is somewhat difficult to predict the extent to which this will be a deterrent to strikes in breach of contract. Despite the frequency of such stoppages, employers even in jurisdictions which allowed suits against unions in their common name, very rarely resorted to the courts. Presumably practical considerations of achieving more harmonious conditions over a long term period will still operate to discourage such litigation.

Should an employer decide to invoke this legal remedy, however, his chances of recovering damages have been increased by the new law. Previously, under section 6 of the Norris-LaGuardia Act, it was necessary to show that the breach of contract was instigated or ratified by the union officers. This has meant that a union treasury was immune unless it could be shown that the illegal actions of the stewards or local officers who caused the strike were officially authorized or approved, according to the recent decision of the Supreme Court in the *Carpenters'* case *(United States v. United Brotherhood of Carpenters and Joiners)*. The new law makes this section of the Norris-LaGuardia Act inapplicable. Consequently, a union is now liable for illegal strikes brought about by business agents or stewards acting in such a capacity, even though it may disclaim knowledge of their actions.

Organizing Campaigns

Certain provisions of the new Act are of particular interest to managers of unorganized plants. Despite the "legal opinion" issued by Lee Pressman, legal counsel of the CIO, on the eve of passage of the conference report, **the old-fashioned technique of stopping an organizing drive by firing the active union employees is still an unfair labor practice.** Moreover, employers who still think that forming or maintaining a company union is the best way of avoiding union organization will continue to find themselves in hot water. **The new Act makes no changes in the language of sub-section 8(2) of the Wagner Act, which deals with company unions.**

The Act does, however, prevent the Board from continuing to accord affiliated unions special advantages at the expense of independent labor organizations, by requiring that, under identical circumstances, the Board in complaint cases refrain from any disparity of treatment.

Free Speech

The new law permits an employer to speak his mind freely without incurring the risks of Labor Board litigation, provided he refrains from coupling his expressions of opinion with threats of reprisal or promises of benefit. While in theory the Labor Board has conceded in recent years that employers had the right to express their opinions, this right was hedged about with certain restrictions. For example, if an employer had ever been guilty of another unfair labor practice, even an innocuous speech was held to be "coercive in such a contest." Similarly, an argument addressed to employees in the plant on working time was deemed illegal interference.

These decisions are overruled by providing that non-intimidating expressions of opinion "shall not constitute or be evidence of an unfair labor practice." However, Senator Taft has pointed out that **this privilege is limited to "views, arguments, or opinions" and does not cover instructions, directions, or other statements by employers or their agents which might be deemed admissions under ordinary rules of evidence.**

Recognition Disputes

Although most employers have usually required a union demanding recognition to obtain a certification from the Labor Relations Board of its majority status, many high-handed union organizers have been able to thwart the policy of the Wagner Act by achieving recognition under pressure of a strike. **The new Act does not make strikes for recognition specifically unlawful.** It does, however, require the Labor Board to entertain an employer's petition for an election if the union persists in making a recognition demand without going to the Board. It also permits employees to file a petition to get the question of majority clarified. Of course, neither of these amendments to the Board's regulation in representation cases affords full protection against a minority strike. They should be potent factors, however, in bringing public opinion to bear against the strikers who are trying to frustrate the will of the majority of the employees in the plant.

Jurisdictional Disputes

If the company is already dealing with a union that has been certified by the Board, then a strike by a raiding labor organization to compel withdrawal of recognition becomes an unfair labor practice under section 8(b)(4). Employers faced with such strikes may not only file charges against the offending union but are also entitled to get the Board attorneys to obtain temporary injunctive relief for them in the district courts until the Board itself has an opportunity to pass upon the case. In such circumstances employers also have a cause of action for damages under section 303(a)(3) of the Act.

Similar remedies are available to employers or employees aggrieved by other specified types of jurisdictional disputes.

Secondary Boycotts

Whether or not there is another union in the picture, affiliates of a union engaged in a strike incur the risk of being cited for an unfair labor practice if they strike against trucking companies or secondary processors which are transporting or handling goods produced in the strike-bound plant. Boycotts of this sort may also be the subject of Board petitions for temporary injunctive relief under section 10(1) of Title I pending decision by the Board and possible actions for damages in the federal courts under section 303 (a).

HOW THE KAISER-FRAZER PRODUCTION BONUS WORKS

Some of the credit for Kaiser-Frazer's first year of operation without a serious strike or work stoppage must go to its Security Trust Fund. This is a simple production bonus plan. For every automobile that rolls off Willow Run assembly lines, the company pays $5 into the kitty. At the end of the year the accumulated amount is split among employees on the basis of man-hours actually worked.

It's as simple as that.

To be eligible to share in the fund, employees must have a record of 90 per cent "presenteeism." They must also have been on the payroll for at least 90 days, and they must not have participated in any unauthorized strike or work stoppage.

Comprehensive in-plant promotion has made the plan a production theme. Posters, scoreboards, and huge mock cash registers graphically record each week's production and the accumulative total of Security Trust Fund dollars.

Only one of its kind in the automobile industry, the plan was first formulated and included in the 1946 contract between K-F and Local 142, UAW-CIO.

A board of trustees—composed of the company's director of industrial relations, the president of the local union, and a public representative—administers the fund. All costs are borne by the corporation.

At the end of the year, the amount of money in the fund is divided by the total number of man-hours worked by all the qualifying employees. Each employee receives an amount equal to this hourly figure multiplied by the number of hours he or she worked. Any workers qualified for participation but laid off prior to December 1 through no fault of their own are still considered eligible to receive checks for the number of hours worked.

Stresses Personal Profit

Provisions of the trust agreement make good common sense, because they demonstrate convincingly that increased production is personally profitable for the employee. The agreement, too, puts a premium on union responsibility, since the fund is not shared in by members who have been guilty of agitating, encouraging, or participating in any unauthorized work stoppage or strike in violation of the union contract.

The Security Trust Fund was relatively small at the end of 1946, because it was based on only a half-year's output—including months when production lines were just beginning to move. The 1946 fund, amounting to $55,036.25 was paid to 2759 employees just before Christmas. Payments were based on $5-per-car shipments of 7515 cars plus $1.25 for each of the 13,969 farm machines shipped by Graham-Paige Motors. Graham-Paige, during 1946, shared the Willow Run plant with K-F and participated in the plan.

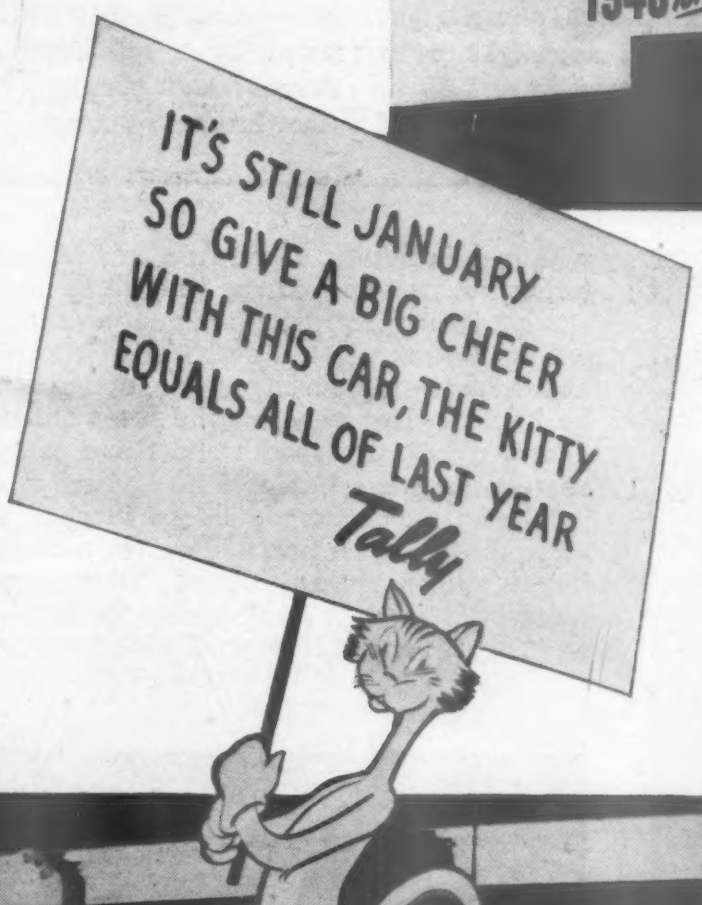
The 1946 checks ranged up to $41.82, with an average of $19.78. Employees receiving these checks worked a total of 2,759,614 man-hours. No workers were disqualified for violating the uninterrupted work agreement. Only 63 employees, or about 2 per cent, were disqualified for having missed more than 10 per cent of their scheduled working hours without excuse.

The 1947 fund now far exceeds the total amount accumulated in 1946. Assuming that shipments approximate 200,000 units, the $5-per-car total for 1947 would be $1,000,000. If 14,000 employees are declared eligible to share in the fund, the before-Christmas checks would average over $70 each.

The unique security fund is symbolized by an impish mascot known to everyone as "Tally-Cat." The arithmetical cat was carefully conceived after a series of employee interviews, and publicity and fanfare have made Tally and the Security Trust Fund more familiar to K-F workers than Popeye and spinach.

Employees must have a record of 90 per cent "presenteeism" to be eligible to share in the bonus. The mascot, who records payments into the "kitty" on a "cats register," is known as "Tally."

Dressed as a cheer leader, Tally may be seen in the company newspaper and on posters throughout the plant



Tally rode down the assembly line in January to let employees know that the trust fund had already passed the 1947 total. Uninterrupted production in 1947 should result in an average bonus of about $70 for each eligible employee

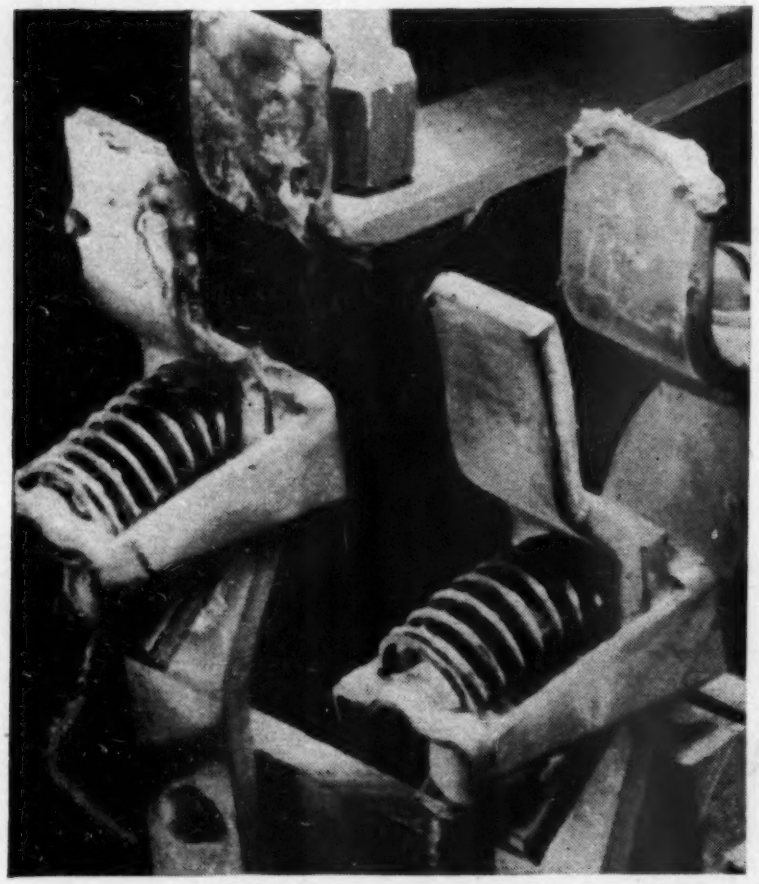
DEFECTS AND MALPRACTICES THAT LEAD TO ELECTRICAL FIRES

C. F. HEDLUND • ELECTRICAL ENGINEER, ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES, BOSTON

Effective electrical maintenance depends first on the proper application and safe installation of the apparatus, then on continued care and inspection. In the pictures and text that follow, the author points out many overlooked dangers, tells how to remedy them.

Industry's electrical fire-loss record is not an enviable one. The files at Factory Mutual disclose that 45 per cent of the electrical fires in the seven-year span from 1939 to 1945 were the direct result of careless or improper maintenance.

Analysis of that record points up some of the most overlooked dangers—dangers that can be eliminated by a minimum of careful thought and planning devoted to electrical maintenance.

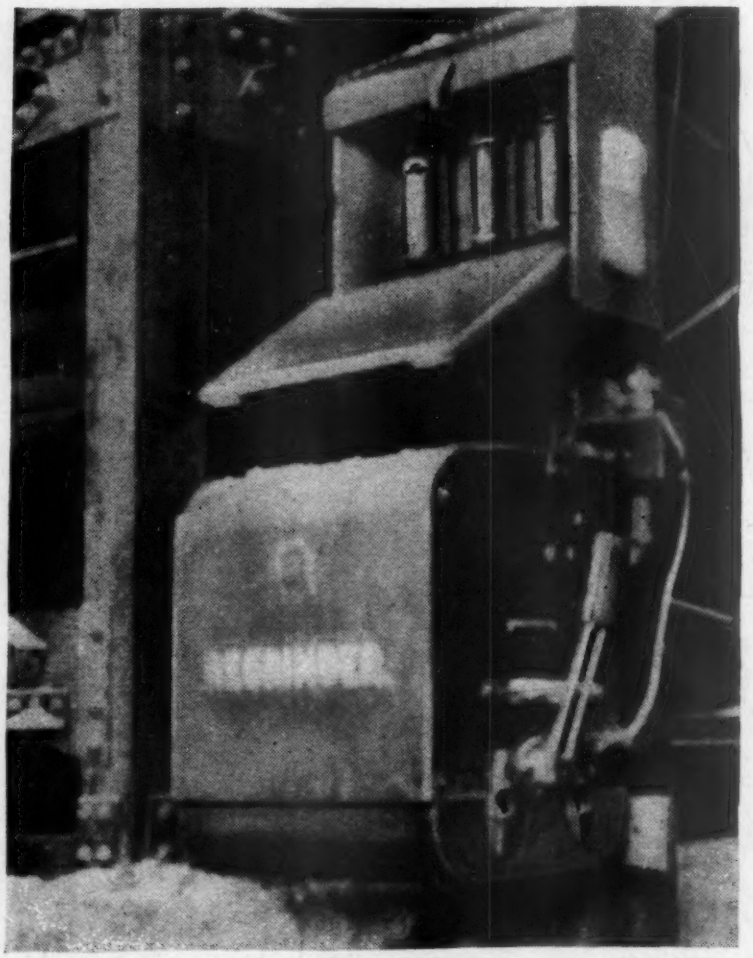


CONTACTS ON MOTOR CONTROLLERS should be reconditioned or replaced when they become worn, burned, or pitted. Contacts such as those illustrated arc severely and create a fire hazard and should be renewed.

Too, the grounding conductor for lightning arresters is occasionally found broken or disconnected and sometimes is found installed in a piece of iron pipe for mechanical protection. Use non-ferrous pipe for the latter purpose because the iron pipe tends to obstruct the discharge of lightning current to ground.

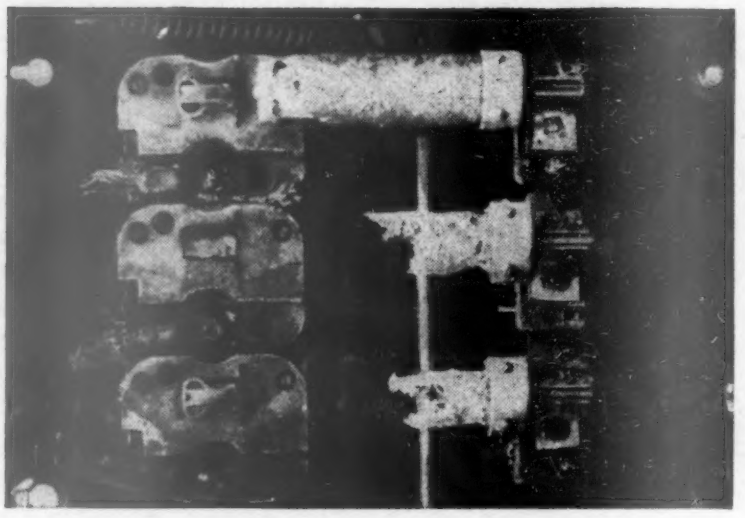
DOORS ON FUSE CABINETS may be missing, poorly fitting, or open. Sometimes cabinets are constructed of wood with asbestos linings, part of which may be missing. The wood is easily ignited if arcing occurs within the cabinet. Open fuse cabinets are an invitation to trouble. Dust, lint, dirt, moisture, and similar foreign substances can enter and accumulate within the cabinet. If overheating or arcing occurs at the fuses or connections, the foreign material may be ignited. Not only are the fuses and fuse blocks damaged but also sparks and flame escape and the surroundings are likely to be ignited.

Missing knockouts should be blocked up, for the same reason, in all fuse and switch cabinets, junction boxes, and motor controllers. Temporary wiring is a potential hazard. Replace it at the first opportunity with a permanent, approved wiring method.



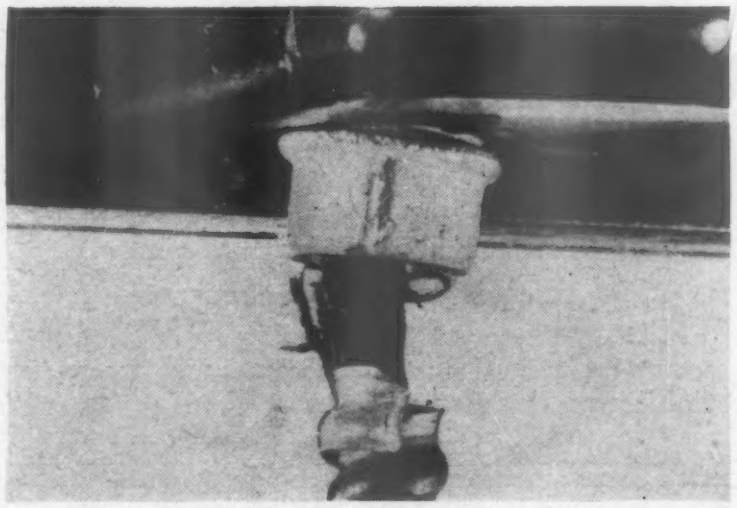
BRIDGED FUSES are probably the commonest defects. Some of the schemes devised to jump the fuse are quite ingenious. The plug fuse with a thin brass strip cut off the bottom edge of the Edison screw shell and turned over to contact the middle pole is particularly difficult to detect; if a good fuse were so altered, it would appear satisfactory on casual inspection and could be detected only by unscrewing the fuse.

The cartridge fuse with the case filled with tinfoil is another example of improper fusing which is easily overlooked if the opening of the case is turned so that it cannot be seen. Solid pieces of bar copper, pipe, nails, and wire also are frequently found in fuse clips in place of a cartridge fuse, not to mention pennies, nickels, and dimes often used by householders in back of a blown fuse when a proper replacement is not at hand.



FUSE CLIPS are often found dirty and corroded, bent or broken, lacking tension, or fitting loosely, so that good contacts are not made with the fuse ferrules or knife blades. Heating starts at the contact points, and arcing begins. The arc gradually increases until the end of the clip and knife blade are partially fused. The air within the fuse cabinet or switch enclosure becomes ionized and a short circuit is then established between phases. The resulting arc is often so severe as to require replacement of the entire fuse cabinet.

Similar failures sometimes occur with the ferrule contact type of cartridge fuse when the ferrule heats because of poor clip contact. The heat causes the end of the element to melt within the fuse case, where it is attached to the ferrule, and the resulting arc gradually increases until part of the fiber case is consumed and the arc is released. Ionization of the air in the fuse cabinet follows, and a short circuit then occurs between phases.



FLEXIBLE ARMORED CABLE is often found pulled loose from the connector as a result of careless installation, severe vibration, or abusive treatment. This leaves the insulated conductors exposed to abrasion. In time the insulation is worn off and grounds or short circuits occur.

Locknuts on the armored cable connectors and on rigid conduit installations also work loose, sometimes because of vibration or because they were not properly tightened to begin with. The continuity of the grounding system is consequently affected, and protective devices will not function as intended; a life hazard is also unintentionally introduced in that metal enclosures which are normally positively grounded, in accordance with the National Electrical Code rules, become ungrounded.

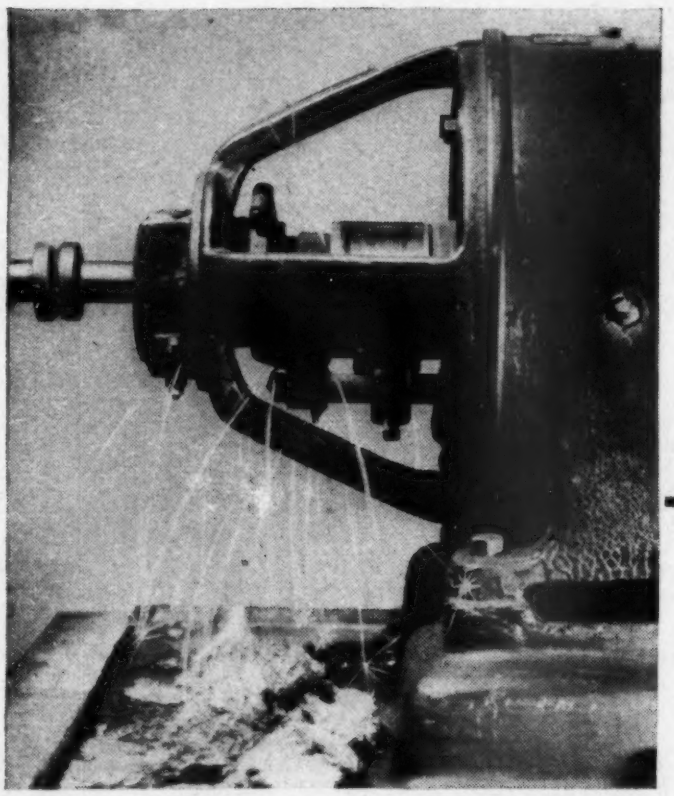
STARTING HANDLES OF MOTOR CONTROLLERS are frequently found plugged, blocked, or tied in the running position, because the latching mechanism or the holding coil which is supposed to keep the handle in the running position when placed there, is out of order. This is poor practice, as a power interruption on the motor circuit for any reason will leave the motor on the running side of the controller, because the controller handle will not automatically return to neutral. When power is restored the motor may burn out and the controller be damaged. Also, machines may be damaged, or operation injured.

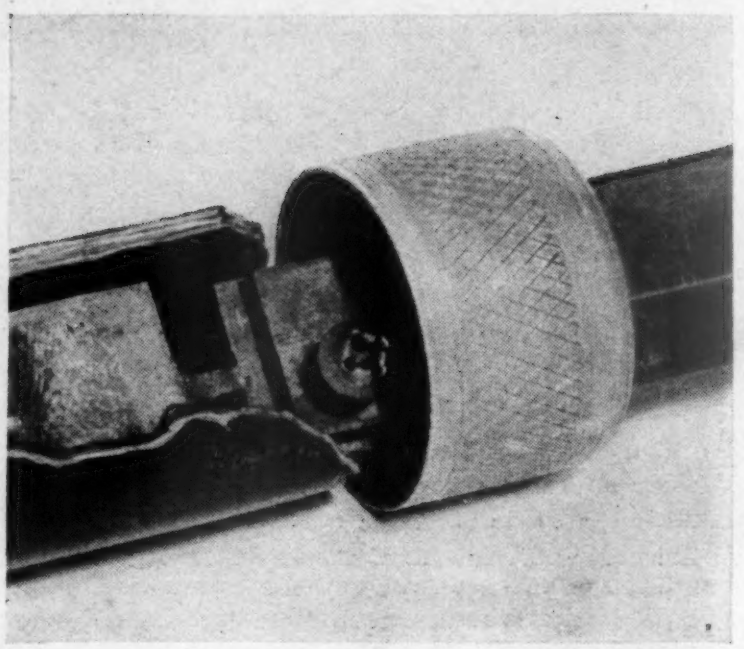
OIL IN TRANSFORMERS is occasionally found below its proper level, and sometimes its dielectric strength is far below its safe minimum, which is considered to be 18,000 volts in the standard tester having 1-in. disks 1/10 inch apart.

Failures may also result from dust accumulating on windings and other parts inside modern high-voltage dry-type transformers. They should be blown out frequently where dusty conditions exist, but it is better not to install electrical equipment in such areas.

CONTINUED ON NEXT PAGE

COMMUTATOR-TYPE MOTORS are a frequent source of trouble when the brushes or commutators, or both, are allowed to become badly worn or the brush rigging dirty. Under such conditions severe sparking and flashovers can occur which not only contribute to further damage to the motor but often causes fires. Combustibles in any form should be kept a safe distance from the motor; the illustration below shows how cotton waste left around the motor is easily ignited when sparks are thrown from the commutator.





IONIZATION OF AIR arcing between adjoining fuse contacts can also take place in a fuse cabinet if a refillable fuse with a badly charred case should "blow" for any reason. The charred cases are usually the result of excessive heating caused by improper assembly of the refillable fuses or poor contact at the fuse clips. This heat is transmitted to the ferrule, which is attached to the fiber case. Charring and gradual disintegration of the case takes place if the condition is not corrected.

COMMON DEFECTS NOT READILY DETECTED

(Usually require the use of tools and the removal of a cover, enclosure, oil reservoir, or some part of the apparatus by competent electricians)

1. Low and dirty oil in circuit breakers and starting compensators
2. Uneven air gaps in rotating machinery
3. Leather bellows too stiff on certain types of solenoid plunger overload relays
4. Oil in the dashpot too thick and gummy, or plugged orifices in the plunger in relays
5. Thermal relays in motor controllers too large for proper protection of the motor
6. Loose parts of operating mechanism on switches and circuit breakers

OTHER DEFECTS EASILY RECOGNIZED AND REMEDIED

1. Loose open wiring resting on pipes and beams
2. Long frayed cords on drop lights wound around or hung on nails, pipes, and beams
3. Worn cords on movable equipment
4. Missing or damaged and poorly fitting covers on switch boxes, panelboxes, motor controllers, and similar enclosures
5. Missing fiber bushings in the caps on metal sockets for cord-pendent drop lights
6. Broken housings on lamp sockets
7. Oversize fuses
8. Missing covers on thermal cutouts
9. Makeshift paper lamp shades
10. Oil soaked or badly worn motor leads
11. Oil soaked and dirty motor windings
12. Oil soaked control apparatus around machine tool equipment and similar oily processes

POWER FACTOR CORRECTION CONTROLLED BY TIME CLOCKS

ROBERT H. HEIDRICH • ASSISTANT PLANT ENGINEER, WALLACE & TIERNAN COMPANY, INC., NEWARK, N. J.

Cutting capacitors in and out of circuit by means of time clocks has been found to be entirely satisfactory at the plant of Wallace & Tiernan. The time clocks are set to put the capacitors, for power factor correction, on the line when the loads come on, and then disconnect them when the machines are stopped.

Power is received from the utility company's lines at 4150 volts, three-wire, three-phase, 60 cycles, and stepped down to 240 volts by three 200-kva. single-phase transformers. Metering is done on the secondary side. The main distribution switchboard is directly over the transformer vault. A second distribution board located approximately 350 feet away from the vault is fed from the main board by three 500-cir. mil cables per leg.

From each of these centers branch circuits radiate to individual distribution panels located in various departments. None of these radial feeders is of any considerable length, except one that feeds an isolated group of buildings from the main switchboard. This feeder is approximately 600 feet in length, each leg being a 500-cir. mil cable. Figure 1 shows the three parts of the distribution system that will be referred to later.

When power factor correction came up for serious consideration, the maximum demand was averaging close to 500 kw. which, at the 0.75 power factor prevailing, meant a load of about 670 kva. The transformers therefore were being loaded to 112 per cent of rating. It was estimated that the over-all maximum demand would reach 585 kw. before there was any tapering off of production. This demand at 0.75 power factor would load the transformers to 130 per cent of rating.

Both the public utility representatives and we felt that this was hewing too close to the limits of common - sense operation, and that power factor correction probably was the key to getting over the peak demand with a reasonable assurance against costly shutdowns, and at the same time avoiding a more costly job of increasing the transformer capacity.

About this time formal notification was received of a change in rate structure imposing a kva. charge when the monthly maximum kva. demand exceeded 115 per cent of the monthly maximum demand in kilowatts.

After the decision to improve the power factor was made the next important question was, "By how much?" Study of this problem developed the fact that if the power factor were improved to 0.87 it would reduce the expected load on the service feeders to the 112 per cent that was currently being carried. This was felt to be the maximum improvement that could economically be made.

The kvars necessary to produce this change was determined to be about 180. Capacitors were selected as the most logical method of correction because the entire power load of the plant is imposed by about 1800 individual motors totaling

The small, light-colored housings at the right contain the time clocks. Magnetic switches are mounted beside them. The capacitors are directly overhead

2500 horsepower. The largest unit is a 25-hp. motor.

A study of the load carried by each distribution panel showed that the feeders were more than adequate to carry the expected increase, and from that standpoint did not need correction. The one exception to this was the long feeder *C*, Figure 1, on which there was considerable voltage drop.

The decision was then made to connect permanently 30 kva. of capacitors at the end of feeder *C* for voltage regulation, and to split the remaining 150 kva. of corrective capacity between the two load centers, *A* and *B*.

It was realized that we were sacrificing some savings by not reducing the losses on other feeders, but we felt justified in grouping the capacitors to cut down the installation time and material.

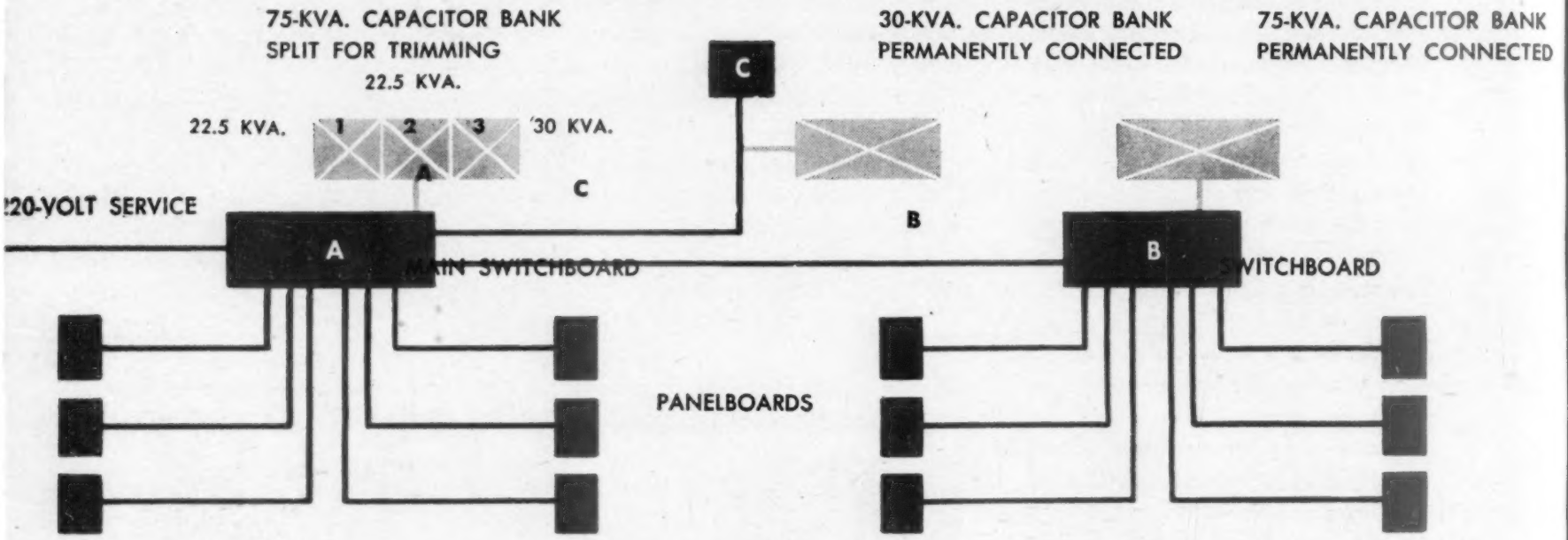
The capacitors were purchased, however, in units of 7.5 kva. each so that there would be flexibility for future relocation. Selection of the total number of capacitors to install was, of course, based on the maximum demand conditions. It was kept in mind that during periods of light loads the system would be over - corrected and excessively high voltages probably would be experienced. This condition did not prevail at that time because of around-the-clock operation.

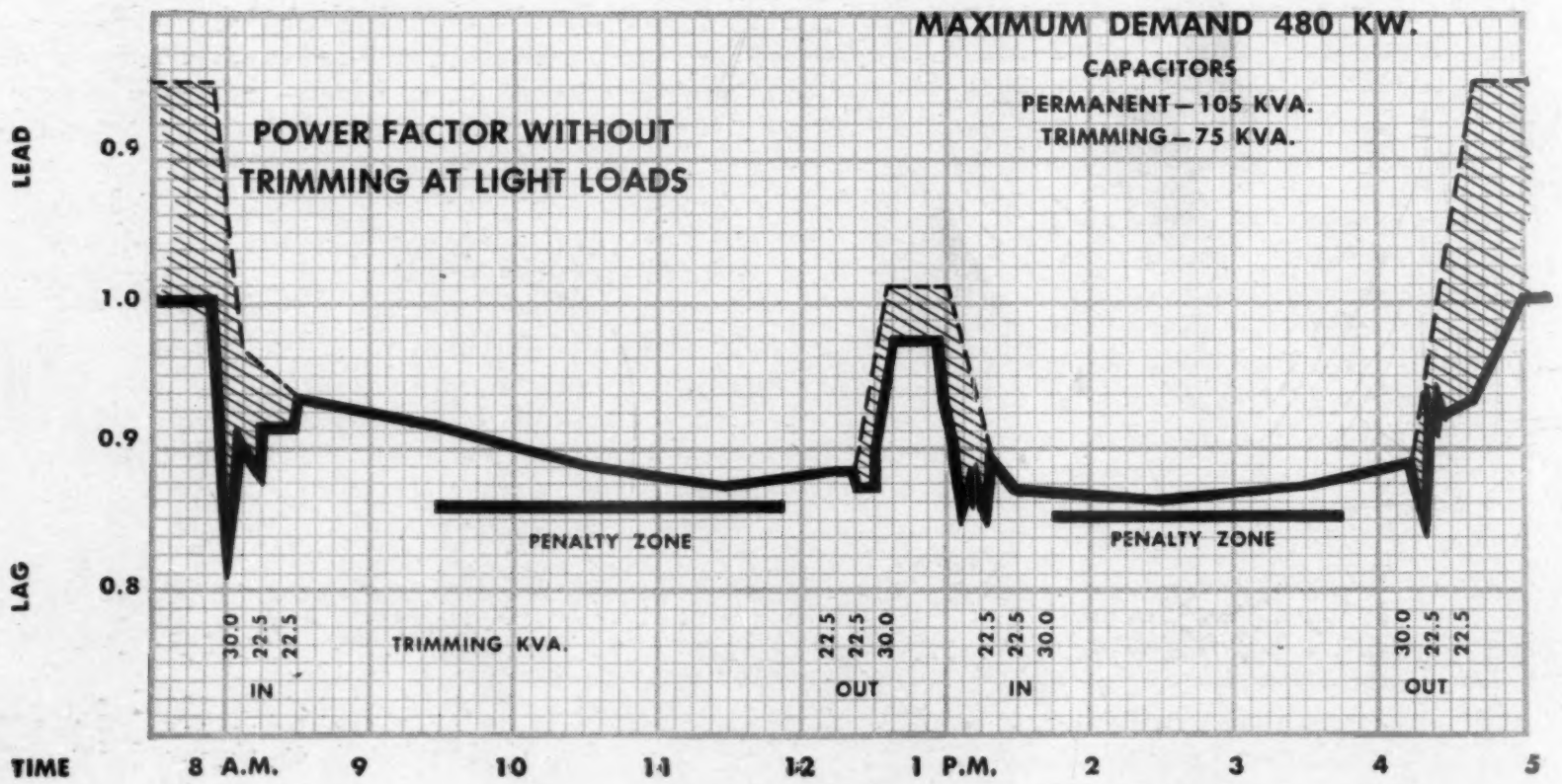
Therefore, the bank of 10 units located at the main switchboard *A* was split into three groups, each group being controlled by a standard time clock. These three banks of 22½, 22½, and 30 kva. capacity respectively could then be used for future trimming.

The 10 units, representing 75 kva., at load center *B* were permanently connected.

On the use of time clocks for this purpose it should be said that they can be used with results approximating those obtained by more conventional means of trimming,

FIGURE 1. THIS DIAGRAMMATIC SKETCH SHOWS THE LOCATION OF THE CAPACITORS IN THE ELECTRICAL DISTRIBUTION SYSTEM





involving the use of voltage, current, power factor, or kvar automatic switching only if the following conditions are met:

1. The daily load pattern, as shown on the meter demand chart, must be repetitive within relatively narrow limits.

2. The time clocks should have automatic time elimination features to regulate scheduled off days, such as Saturday and Sunday.

3. Provisions should be set up, preferably within the framework of a routine maintenance schedule, to provide manual elimination for odd days off such as holidays.

Only if these three conditions prevail will there be any possibility of successfully using a time clock for switching capacitors on and off.

Careful checking of the conditions in the light of these requirements gave promise of successfully using time clocks for trimming in this particular application.

An important step involved selection of the times for cutting capacitors into and out of circuit. The times at which the plant loads were thrown on and off were known, of course, and the following schedule was set up for cutting capacitor banks 1, 2, and 3 in and out:

Bank	*Morning In*	*Morning Out*
1	8.05	12.30
2	8.15	12.30
3	8.30	12.25
Bank	*Afternoon In*	*Afternoon Out*
1	1.05	4.30
2	1.10	4.25
3	1.15	4.15

Experience has shown that this schedule is satisfactory, and it is still in effect.

Figure 2 shows a typical daily power factor chart.

It was not necessary to synchronize the switching of the capacitors closely with the starting of the motors. The reason is that with approximately 1800 motors ranging in size from fractional to 25 horsepower, a relatively large number of these motors can be started or stopped without materially affecting the over-all characteristic of the demand chart, because of the small percentage of horsepower involved.

Figure 2. A typical daily power factor chart shows time and effect of cutting 75 kva. of corrective capacity in and out for trimming

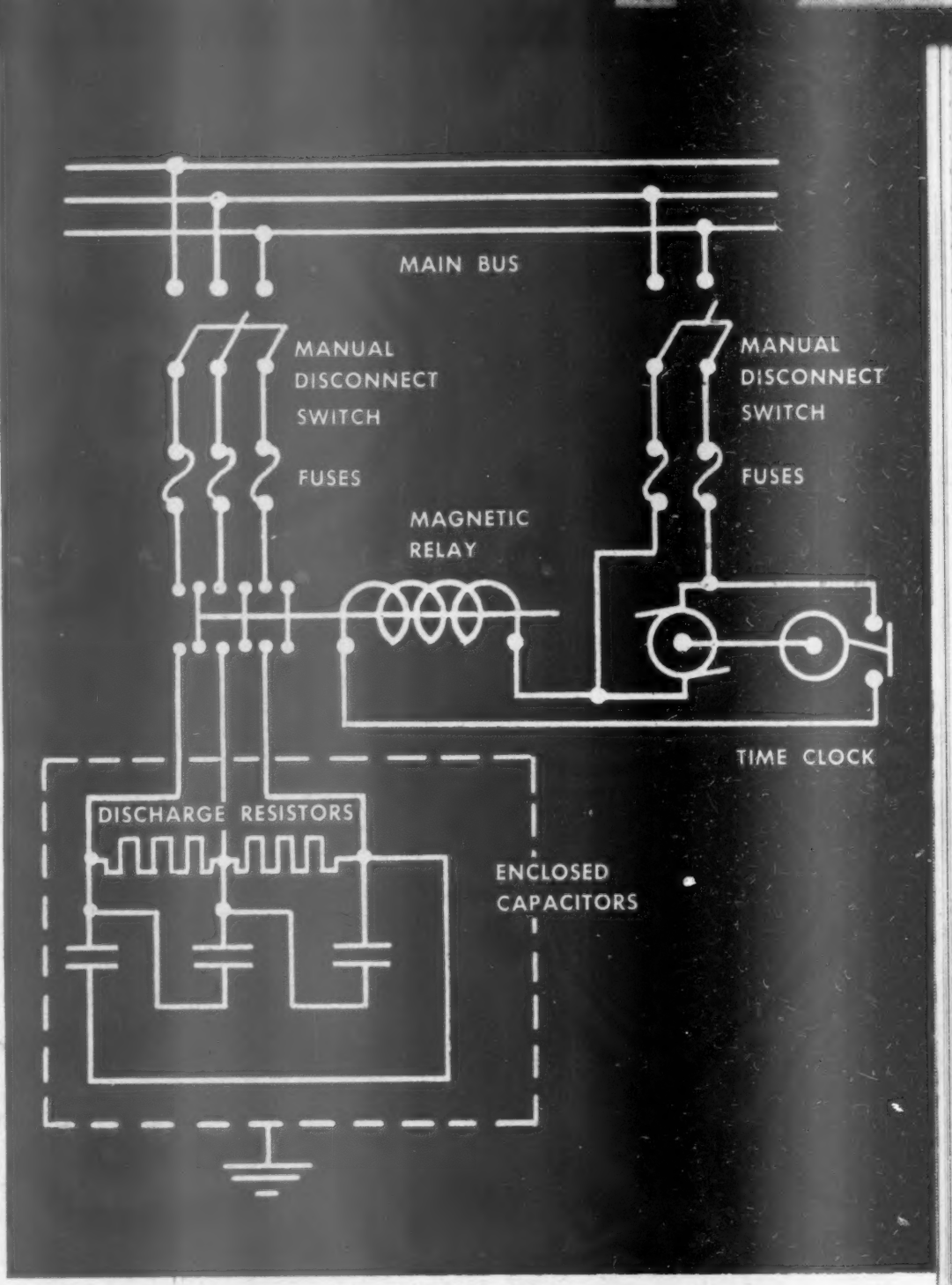


FIGURE 3. TIME CLOCKS AND CAPACITORS ARE CONNECTED AS SHOWN IN THIS DIAGRAM

Each time clock is provided with a small manual trip lever that is used when the capacitor switches are to be closed or opened at times other than those for which the clocks are set.

Figure 3 shows, in simplified form, how the time clocks and capacitors are connected.

In our plant, experience with this method of switching capacitors has been uniformly good. Our use of time clocks for this purpose is somewhat less than a year old, however, and there is always the possibility of an unforeseen development occurring. It has always been possible to synchronize the power factor with load conditions keeping in mind, of course, that synchronizing is used in a rather broad sense and that the degree of control necessary to achieve the results desired is rather coarse.

The only trouble experienced at any time is that some months ago one of the pins on a time clock came loose, thereby eliminating the morning cut-in time on one of the capacitor banks.

The present demand has been averaging 480 kw. Power factor during maximum demand periods has averaged around 0.88. During off periods it averages between 0.98 and unity. The average daily power factor chart, Figure 2, indicates what the power factor would be during off periods, without the provisions for trimming.

GIVING EMPLOYEES ECONOMIC FACTS IN PICTURES

Tell the why's and wherefore's of our national economic structure. Tell the story in such a way that the average worker can understand it better. Do this, and you will have taken a long step toward better labor-management understanding.

One way to take this step, in General Motors' experience, is through special economic releases prepared for plant papers. Samples of such releases prepared by the GM Employee Publication Service are shown on these pages.

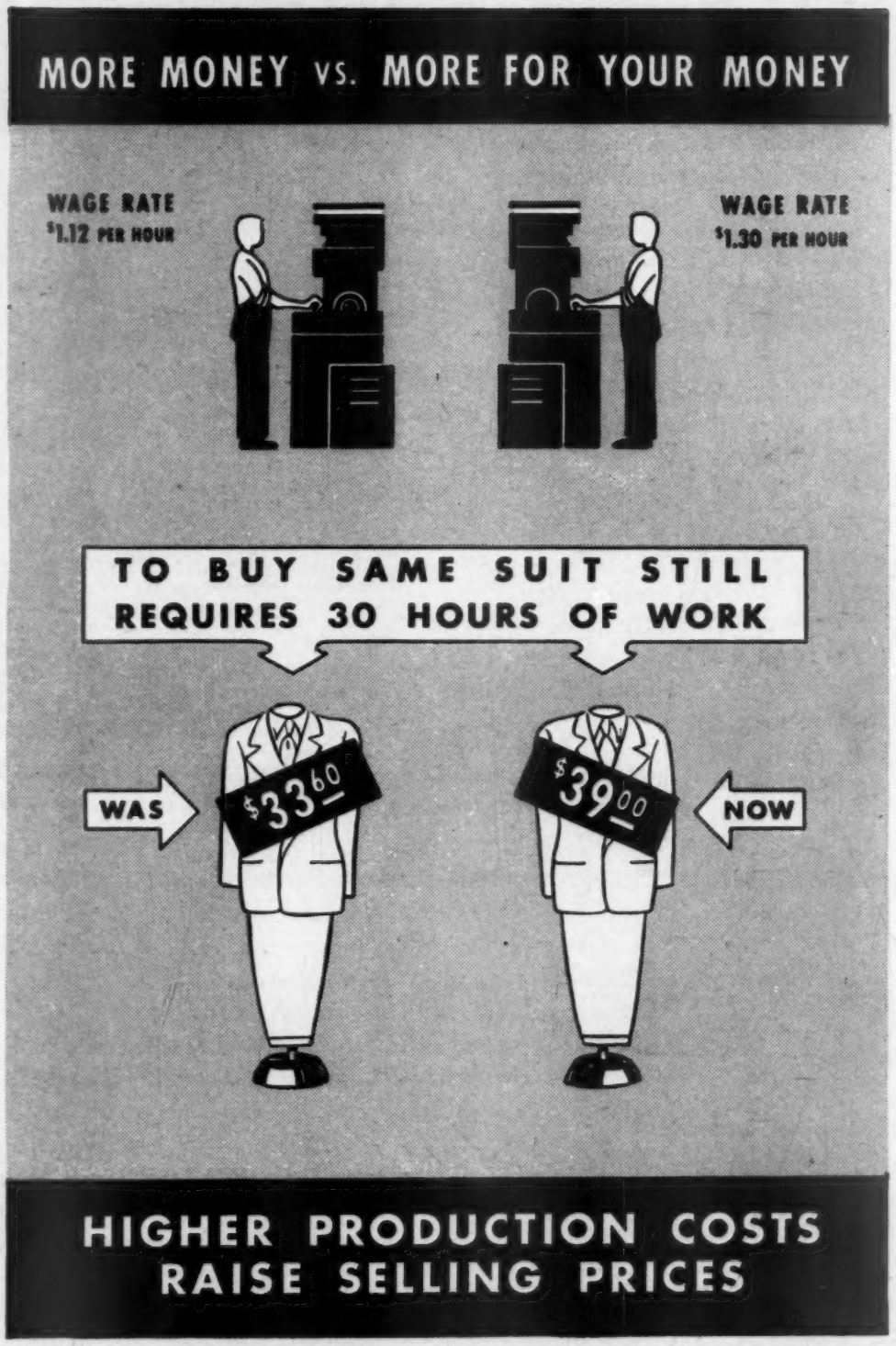
This material is sent to editors once a month. Each release consists of an 8x10 black-and-white "humanized" chart, to which explanatory copy is attached. Every effort is made to work up charts that can be understood at a glance, without referring to the copy. Copy may or may not be run with the chart, as the editor prefers.

Maximum Circulation

The number one objective of each release is to present the material in such a way that the worker can immediately recognize his advantages in our economic way of life. The subject material is general in nature. No mention of a specific GM product or activity is made. This is done both to insure maximum circulation in divisional plant papers and so that any editor can rewrite and localize the material to fit his own individual plant needs.

This economic material is not a "must" as far as the individual editor is concerned. He may use it or not as he sees fit. However, since the first release was prepared in April, 1946, more and more GM plant papers have made regular use of the material.

In-the-plant reader surveys indicate that some good is being done.



Economic "graph" supplied all GM papers shows forcefully that last year's hard-won 18-cent wage boost brought workers little or no net gain. Prices were immediately forced up to where they were again in balance with industry's costs, which are mostly wages

In many instances, especially in the case of a small publication with a one-man staff, a two-fold benefit is realized. Not only is information given to employees, but the local editor does not have to undertake the time-consuming job of preparing his own material.

BUSINESS PROFITS *mean* WORKER BENEFITS

HIGH PRODUCT COST

VERY FEW JOBS

LOW PRODUCTION

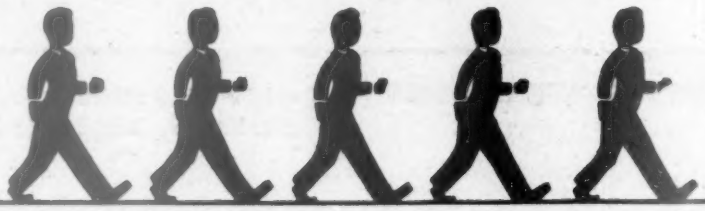
LOW WAGES

LOW PRODUCT COST

MANY JOBS — 1940 — PEAK PRODUCTION

HIGH WAGES

THE BIG FIVE



CAPITAL — MANAGEMENT — MATERIALS — LABOR — PROFITS

BETTER PRODUCTS

WAGES — **JOBS**

OPPORTUNITIES

EXIST WHEN A BUSINESS PROSPERS

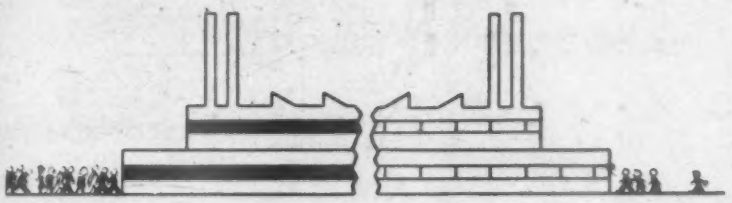
INDIVIDUAL PRODUCTION

- Safe
- Efficient
- On the job

- Careless
- Wasteful
- Absent

Full Production — **Partial Production**

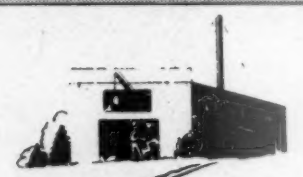
Lower Production Cost — **Higher Production Cost**



MORE JOBS — **FEWER JOBS**

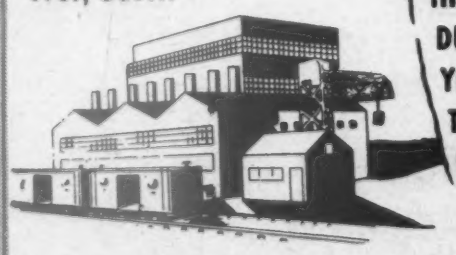
In 1847

YOUR GREAT GRANDPA ENJOYED A STANDARD OF LIVING JUST A LITTLE BETTER THAN DID HIS GREAT GRANDPA IN 1747, BUT...



In 1947

YOU ENJOY THE HIGHEST STANDARD OF LIVING SINCE THE START OF CIVILIZATION. DURING THE LAST 100 YEARS, COMPETITION BETWEEN MANUFACTURERS HAS RESULTED IN BETTER, MORE AND CHEAPER GOODS!



COMPETITION—*THE LIFE BLOOD OF TRADE*

POSTERS AND RELEASES ARE PREPARED BY GM EMPLOYEE PUBLICATION SERVICE AND SENT REGULARLY TO EDITORS OF ALL PLANT PAPERS

A NEW PLANT BUILT FOR LOW-COST PRODUCTION AND UPKEEP

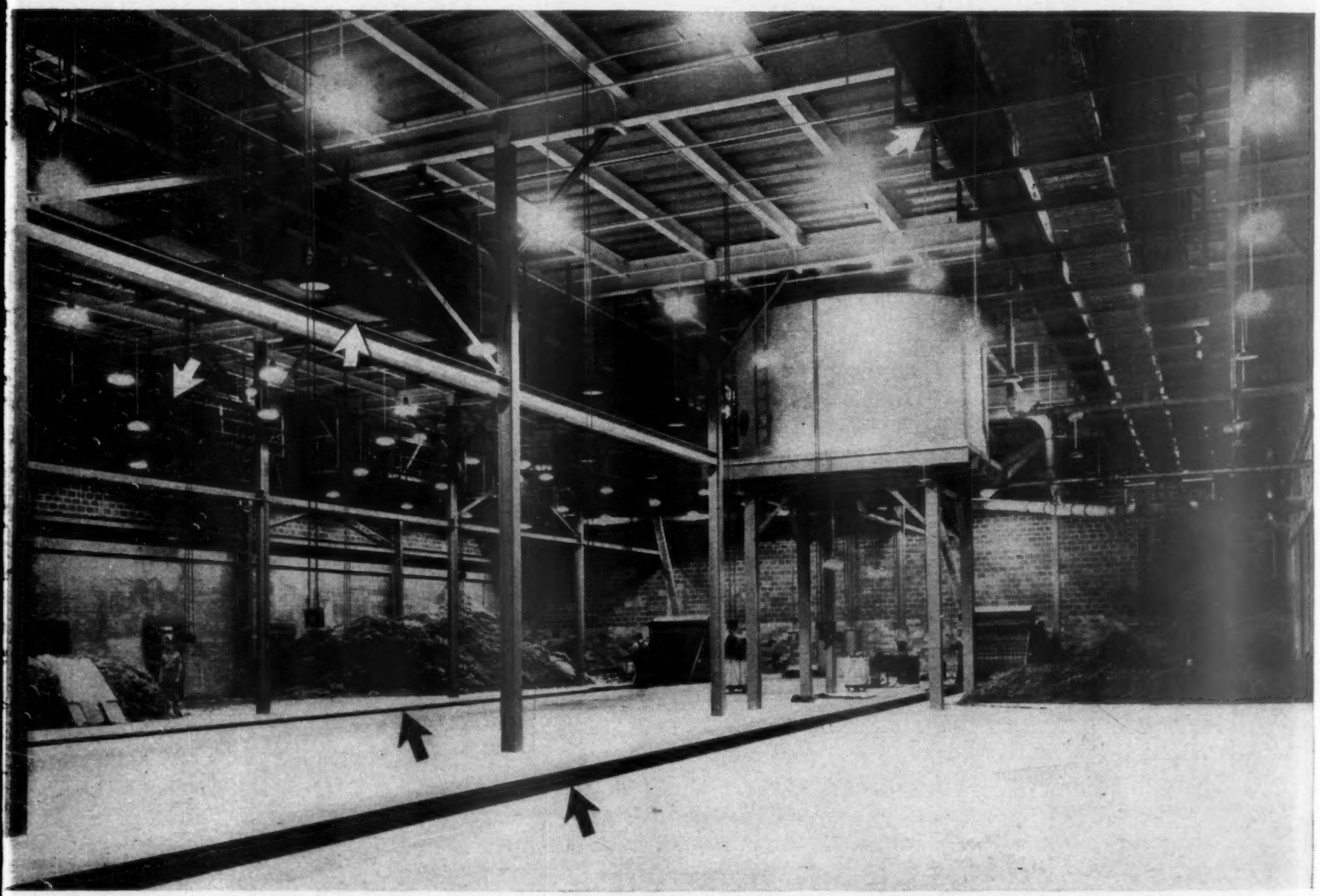
ROBERT E. OBERHOLTZER • CHIEF ENGINEER, JAMES LEES & SONS COMPANY, BRIDGEPORT, PA.

To the growing number of plants that are "built around the processes," add a new carpet yarn mill at Glasgow, Va.

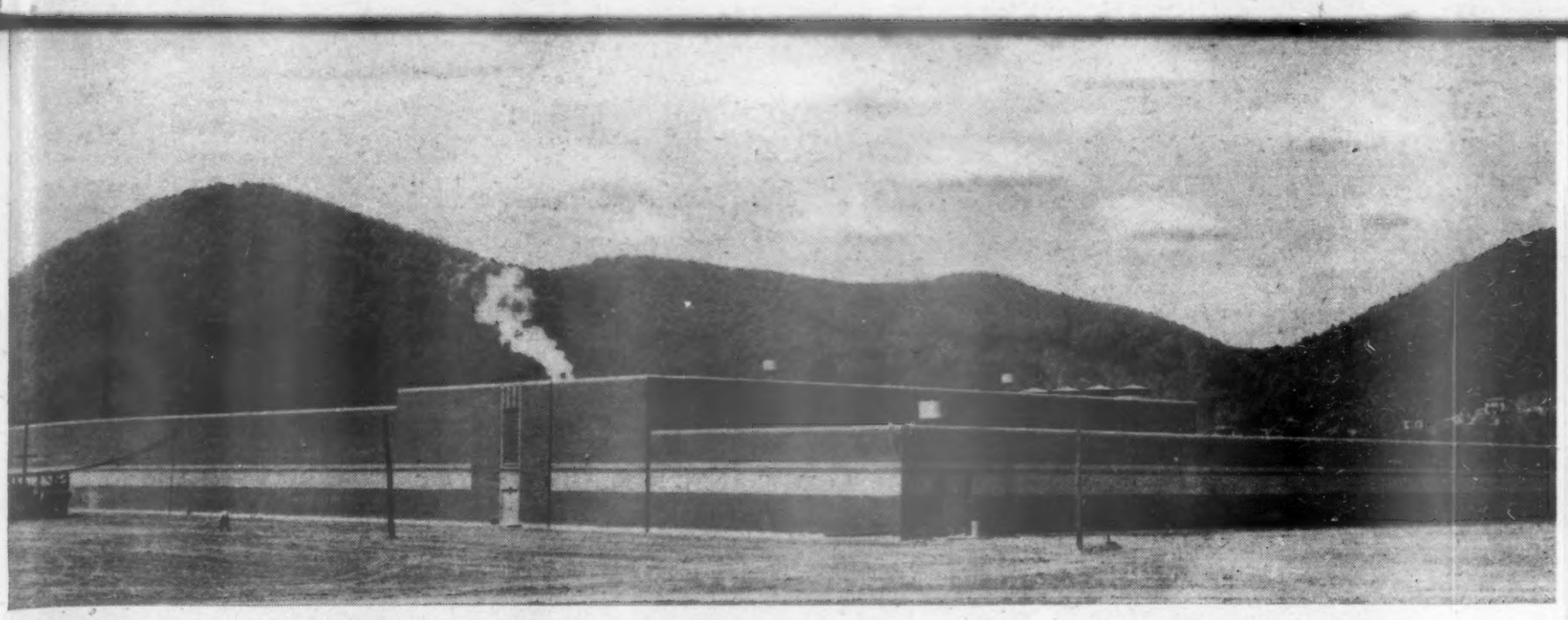
The design of this plant was also keyed to three other major objectives—low-cost maintenance, use of mechanized handling wherever possible, and provision of excellent working conditions. Achievement of these four objectives, in management's opinion, could only lead to maximum production of a product of highest quality at the lowest possible cost.

This plant was built as an adjunct to the company's existing two large carpet weaving mills located on a 100-acre tract nestled in the foothills of the picturesque Blue Ridge mountains. Floor area requirements were based on operation of 12 two-card sets of carding machines and all proportionate complementary machinery to produce woolen carpet yarn of various colors from bales of raw wool. With the exception of an office wing and small service buildings, all departments are housed under one roof in a vault-like one-story rectangular structure, 459x309 feet over-all.

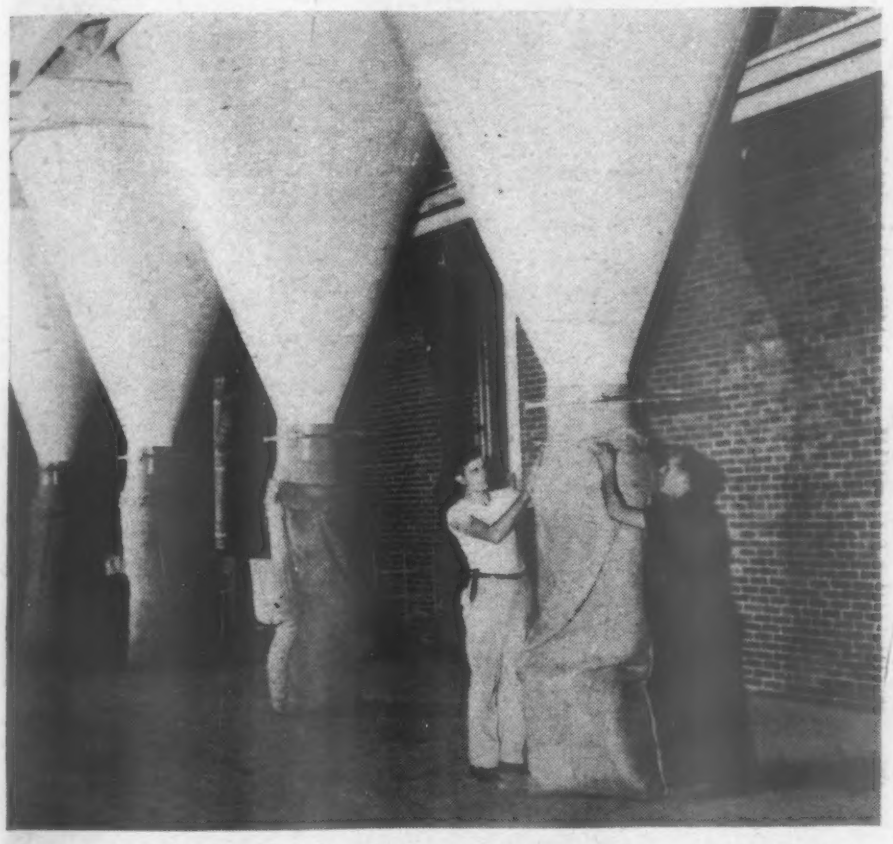
The new building is of structural steel framework, with masonry brick partition walls, and has what is claimed to be the largest pre-cast concrete slab roof yet built. Over the concrete slab decking is a 1½-in. layer of fiber glass insulation with



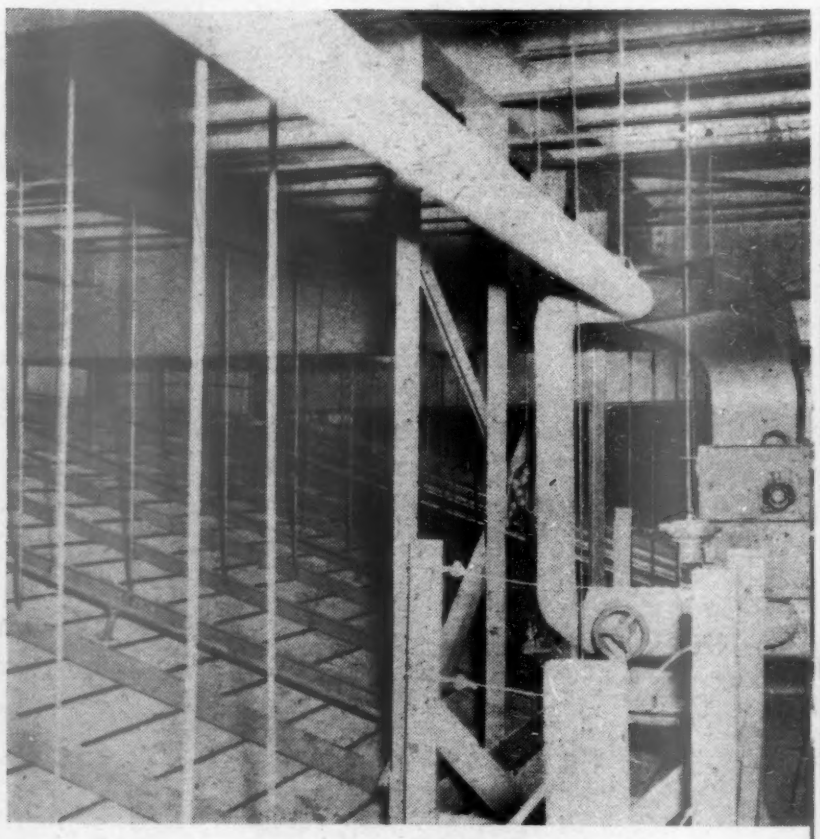
Mechanized handling equipment has taken over in the blending room. Arrows point to three overhead conveyor systems which drop wool to any one of 45 places on the floor, and to two recessed belt conveyors which carry mixtures to pickers at the far end



IN THIS VAULT-LIKE STRUCTURE DYED WOOLEN CARPET YARNS ARE PRODUCED FROM BALES OF RAW WOOL



Wherever loose wool is sucked from a hot, wet process, humid air is diverted, and dirt and short fibers are piped to collectors



Attic above the skein-dye section is heated by unit heaters to keep hung ceiling temperature above the dew point

a covering of fiberboard, on which has been laid a built-up slag-covered roof. Column spacing in general is on 25⅓x28-ft. centers. On the four outside walls both a narrow and a wide horizontal band of modern gray brick give a pleasing relief to the otherwise solid red brick facing.

Possibilities for future expansion were not overlooked in the building plans. Each major department was spotted along at least one outside wall, at the same time providing for an efficient flow of work in process in a *U*-shaped pattern. To the same intent, underground mains for connection to sprinkler lines were kept 150 feet clear around the building.

Design details of the building interior, such as floors, walls, and ceilings, vary with the diversified requirements of each department. These requirements also dictated special treatment in the provision of plant services such as light, heat, power, and ventilation. There follows, therefore, first a brief description of the more outstanding uniform points of design, succeeded by those of special departmental application.

1. MATERIALS HANDLING

Wool received in bales in freight-cars on the platform siding is handled by fork lift trucks until opened Smaller loads are palletized wherever possible, and remain on pallets until placed in process.

After scouring, wool is sucked to an upper level for wool storage from whence it is dropped to the raw stock dyeing operations. After dyeing it is sucked to the blending room, where all handling is by conveyors controlled at numerous automatic pushbutton stations. Wherever loose wool is sucked from a hot, wet process to dry storage, a "ceiling condenser" at the outlet separates the hot, moist air, dirt, and short fibers, which are piped to one of four centralized cyclone-type separators. Here the fibers are reclaimed for salvage, while the air is exhausted

outside the roof. Heat, moisture, and dust are thereby prevented from entering clean air-conditioned workplaces.

2. AUTOMATIC CONTROLS

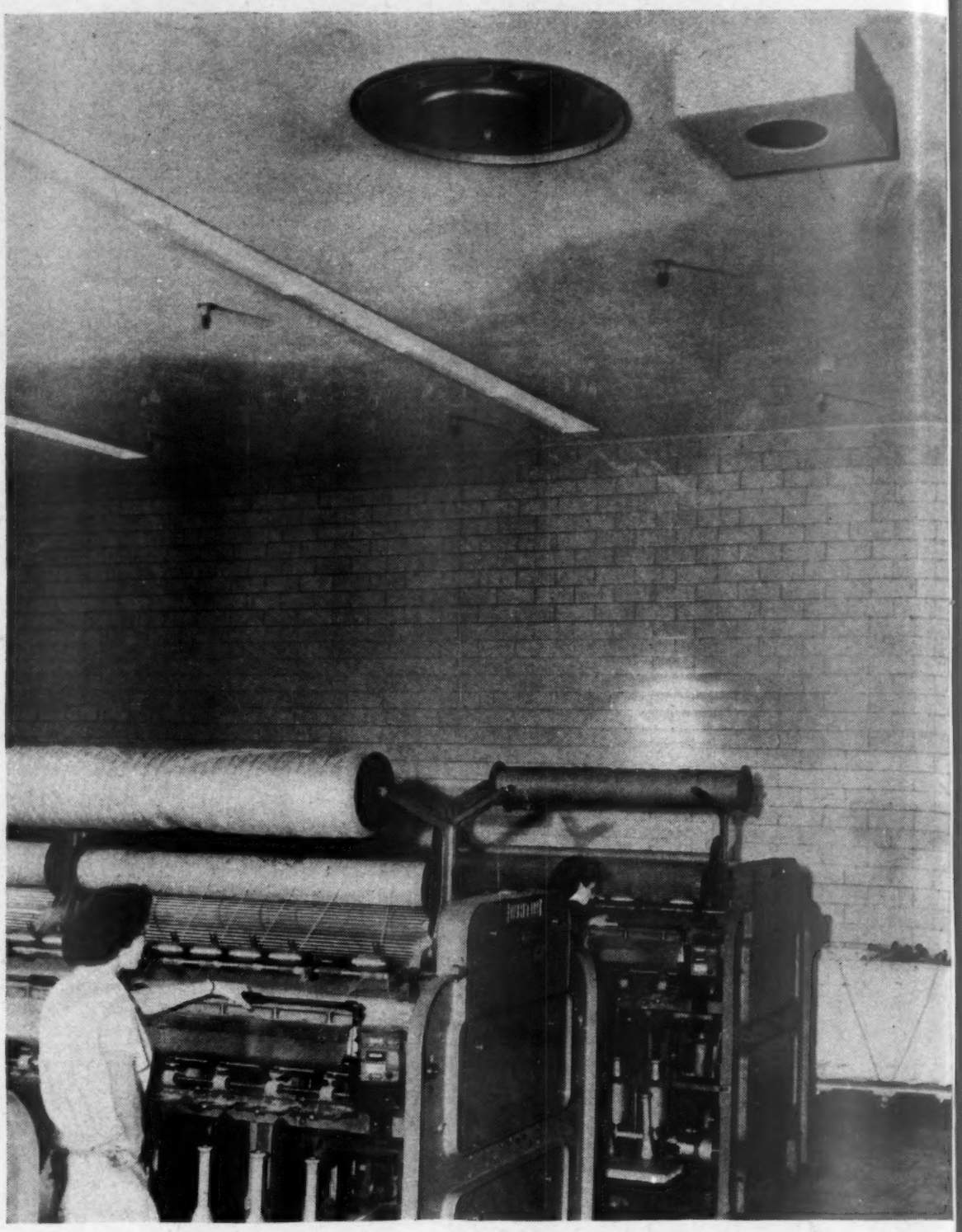
Much of the machinery throughout the plant is equipped with push-button controls for power and with sensitive automatic controls for temperature, pressure, rate of feed, and operation time-cycles. Wherever possible, particularly in wet-process departments, all controls have been centralized in steel-clad cabinets or on group panels away from the machines. Not only does this practice allow easier maintenance but it also reduces abuse, and wear and tear.

3. FLOORS, INTERIOR WALLS

A variety of materials is used in the flooring. These range from creosoted wood block in the machine shop to acid-proof brick in the dye houses. Mill offices have asphalt tile, and the laboratory has rubber tile, both laid over concrete. Locker room and toilet floors are cement.

Of particular note are the maple parquet floors in the spinning and finishing departments, laid on a concrete base in 9-in. squares of six strips each with the grain of each square at right angles to the next. The cross-grain pattern wears better, besides simplifying floor repair without detracting from its original appearance.

Interior walls are salt-glazed tile practically throughout, promising maximum cleanliness with low-cost maintenance.



Excellent working conditions in the spinning room are brought about in part by tile walls, parquet floor, acoustical ceiling, fluorescent lighting, and many music units

4. PAINTING

Color conditioning has been applied to the entire plant, using the standard ASA codes plus the exclusive use of red for fire protective equipment, of blue on electrical panels and switches, and orange for the interior of fuse-box doors.

Each room was given a special color study to derive the highest benefits in employee safety, comfort, and efficiency from the functional use of color. Ceilings are mostly white, and sidewalls of light shades down to dado height where medium grays and greens predominate. Doors and frames are medium green, tan, and gray.

All exposed wall and overhead piping is made as inconspicuous as possible by painting it the same color as the background. Pipe color coding of contents is maintained by a code band around each pipe where it enters or leaves the room, also at each valve, with an arrow to show direction of flow.

5. ELECTRICAL DISTRIBUTION

Because of the relative permanency of machine layout, power distribution is largely through insulated cable carried either in conduit or in multiple circuits laid in square ducts. Where machinery was not likely to be tied to fixed positions, such as in the machine shop, bus bar conductors with flexible plug-in switches are used. Where feasible, motor controls are grouped in centralized enclosed panels. Thermal overload protection is standard.

In all wet-process departments moisture-proof electrical equipment is standard. All conduit and piping in wet-process rooms was kept at least 1½ inches away from any wall surface, to permit keeping the wall clean, and to allow the pipe to dry

all around and thereby discourage corrosion.

An emergency lighting system is supplied by an automatically controlled gasoline engine-driven generator in case of power-line failure. A plantwide public address system furnishes music to lessen fatigue, and is used for announcements to personnel.

6. PIPING

Well water, which is used first for air conditioning and then for processing, leaves the wells at approximately 56 deg. F., and is stepped up to 70 degrees in the air conditioning process. It is then pumped to the filtration and water softening plant and thence into a large soft water storage tank. Water for process requirements is drawn from here, and pumped through the condensers (heat exchangers) of the steam turbines that drive the air conditioning fans, which raises its temperature to about 130 degrees. Thus, a 74-deg. rise in water temperature has been accomplished at only the cost of pumping.

A portion of the water is further raised to 185 deg. F. by an instantaneous type heater and stored in a 40,000-gal. tank for use in the dyehouses. The remainder is maintained at 130 deg. F. in an 18,000-gal. storage tank for use in the scouring room. This flow arrangement eliminates peak loads on the boiler plant by the heating of process water at a continuous rate as a byproduct of turbine operation.

For minimum maintenance, all hot water lines in the plant are of copper pipe, with welded joints and flanged valve connections. All metal water-storage tanks have electrical systems for rust prevention.

Boilers were installed for future high-pressure operation. Steam is delivered from the boiler houses at 125-lb. pressure to pressure-reducing stations in the plant where it is reduced to 35 pounds for processing and turbine operation, and to 5 pounds for heating and air conditioning. Condensed steam from process and heating equipment is returned by condensate pumps to the boiler house for fullest economy.

7. AIR CONDITIONING

Several air-conditioning systems have been installed to meet the various process requirements for ventilation and control of temperatures and humidities prevailing in a wool yarn plant. The main system serves the carding and spinning room, and a supplementary smaller one provides for close control in the physical and chemical laboratories. Other systems provide for ventilation and

Raw stock section of dyehouse. Overhead monorail system leads from stainless steel pressure kettles to deep pit feeds in background. Arrow points to opening around kettle for warm, dry air from plenum chamber below

humidification in the blending room, and ventilation (with controlled temperatures) in the yarn storage, locker and toilet rooms, skein and raw stock dyeing, general facilities, and other service areas.

The main system consists of an air washer, air filters with renewable paper mat filters, lint screens, water circulating pumps, steam turbine-driven supply and return fans, and a system of duct distribution with suitable automatic controls for obtaining a temperature range of 75-80 degrees and a humidity range of 55-60 per cent. Its capacity is 165,000 c.f.m. Duplicate equipment is provided in certain parts for proper maintenance to insure continuous operation.

The blending room system maintains a minimum humidity of 65 per cent, with variable temperatures, depending upon the season of the year.

8. SCOURING DEPARTMENT

In wool-opening operations, exhaust hoods suck all dirt and dust away. Suction systems and gravity chutes are used to move loose, bulk wool.

Electrical operations in the whole room (76x168 feet) are automatically controlled from four central panel stations. A large central panel of automatic instruments controls temperatures in the scouring bowls and dryer, and rate of fresh water feed, also the operation of valves by compressed air for dumping out dirt collected in the scouring process. Pneumatic squeeze rolls are automatically controlled for pressure.

At two locations, electro-magnets are used to remove metals from the raw stock, thereby preventing serious damage to process equipment in later operations.

9. BLENDING ROOM

Mechanized handling is the word here, developed to the "n"th degree. Wool from the raw stock dyehouse is sucked to an overhead reversing conveyor system (at 20-ft. elevation) which can drop the wool to the floor in any one of 45 places over its area of 101x168 feet. Conveyor belts recessed 12 inches below the floor carry the mixtures to deep pit feeds leading to pickers at one end of the room. All blending room conveyors are controlled at automatic pushbutton stations.

10. DYE HOUSE

Usually the center of many maintenance and operating problems because of heat, moisture, and chemical corrosion, this department seems to have overcome traditional difficulties by the design of the room and equipment.

Under the main floor is a concrete basement which acts dually as an air plenum and a pipe chamber for all dye vats. Vats and other machinery are set in carefully measured floor openings of an oversize contour, leaving an open space around each circumference. Through this space is blown heated air introduced from the outside air into the basement below at slight pressure under automatic temperature control. This rising dry air provides a film around each kettle, which is provided with suitable baffle around its circumference, and protects the worker against steam, fumes, and heat. Also, it absorbs waste steam, and eliminates fogging. The saturated air continues to the ceiling and is exhausted to the atmosphere through natural draft ventilators designed for later insertion of power units if ever necessary.

Ceiling condensation and drippage is prevented in the skein-dye section, which uses open vats, by maintaining a dye-house ceiling temperature above the room dew-point. This is uniquely achieved by provision of a hood-shaped smooth-finished cement-plaster hung ceiling, 30 feet high at the mid-point of exhaust, which also protects the attic space from the rising fumes and moisture. The ceiling is heated by unit heaters *inside* the attic space. There is no exposed structural steel in the dyehouse except the materials handling equipment. All service lines are in the dry basement, accessible for maintenance.

All dyeing equipment is of stainless steel. All water pipes leading *to* kettles are of copper, but all drain pipes *away* from kettles are of special acid-resisting alloy.

Materials movement is highly mechanized. Wool stock is dropped from chutes leading from an upper level into raw stock dye vats. A 5-ton traveling monorail hoist carries raw stock from the vats to deep pit feeds, rinse bowls, and dryers. Two 100-ft. craneways with four 15-ton cranes move the heavy wet skein dyeing racks from the 2000-lb. kettles.

Air-lock vestibules between the dye house and adjacent departments prevent harmful interchange of atmosphere. Doors will be equipped with electric eye for positive action.

11. SPINNING ROOM

Actually containing the carding, twisting, and finishing operations as well, the spinning room measures 279x168 feet. All machines are unit motor-driven.

Air conditioning is accomplished by provision of a hung flat ceiling at 15-ft. height containing stainless-steel ceiling diffusers symmetrically arranged for air inlet distribution. In the 10-ft. attic space above the hung ceiling are located all air conditioning ductwork, electrical wiring, sprinkler piping, and other service equipment. Catwalks are provided for maintenance servicing.

Air is exhausted from the room at floor level through stainless steel grilles spaced intermittently along two opposite walls; the grilles lead to concrete walkway tunnels following the length of the wall immediately below. These two tunnels are connected by several similar parallel transverse tunnels located in such a way that electrical power lines could be brought up to each machine. Return air is sucked through the tunnels by the large return-air fan for retempering and recirculation. Heating is obtained by unit heaters located *within* the ducts above the hung ceiling.

For noise reduction the hung ceiling was constructed of acoustical plaster. Heat insulation costs were conserved and undesirable air circulation in the room was minimized by heating the attic space with unit heaters, thermostatically controlled, located *outside* the ductwork.

A "sustained" lighting intensity of 25 foot-candles is achieved in the spinning and twisting sections of the room by continuous runs of fluorescent fixtures on 12½-ft. centers recessed in the ceiling.

LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

Success of the Taft-Hartley labor law will depend on how much chance it gets.

Truman vetoed it. Will his administration back it up? That's the big question.

Green and Murray already have spoken. The AFL and CIO will fight the law. Every device possible will be used to undermine it. Favorable rulings will be sought from the National Labor Relations Board, then from the courts.

NLRB opposed enactment of the labor bill. Will it now carry out Congress's intent? Will it give the law a chance to work? It's true the courts can upset NLRB. But the law leaves much discretion to NLRB which the courts must accept. Remember the Wagner Act!

Keep your eye on NLRB's general counsel. He gets many new duties, becomes the key man. As prosecutor he can be a "labor czar." He's his own boss, independent of NLRB.

This general counsel controls NLRB field offices. He alone decides whether a complaint justifies prosecution. Further, he can subpoena records at the behest of either party. Abuse of this rule could lead to "fishing expeditions." Here Walter Reuther can get his "books" opened. More important: The general counsel initiates injunction proceedings.

A tide of criticism may rise against the new law during the first year. Cases will pile up. Decisions will be delayed — until policy rulings flush many of them out. Union leaders will try to discredit the law before the Senate-House labor study committee. Its first report comes March 15.

Actually, all of the labor machinery's new wheels won't be turning until next year. Then most curbs on closed shop, check-off, and welfare funds finally become effective.

In some respects, employers will be policed more by the Taft-Hartley law than they were by its predecessor. They can't deduct union fees from a pay check without the worker's okay. Or contribute to a union welfare plan except under certain conditions. If they violate? They risk $10,000 fine and one year in jail.

New NLRB elections are required. So many, in fact, that permanent voting booths might not be a bad idea in some plants. Elections for guards, for crafts, for professionals, for union shop, against existing union shop. Also: Election on "final offer" of management in national emergency disputes. Elections can be sought once a year by employer or union or minority.

Look for a revival of Labor's Non-Partisan League. This is John L. Lewis's political aim. The AFL may join in it. Or set up its own PAC. Reason? The new law bans use of union funds to influence any federal primary or election. But union members can contribute to a separate political organization.

In this connection, union newspapers may not take sides in a federal campaign unless they are financed by subscriptions rather than union funds. Unions may not issue political leaflets, pay for radio talks, rallies, etc. They now come under same curbs as corporations.

State laws get recognition on the closed shop question. Thus laws in 13 states which bar any form of compulsory union membership get precedence over the Taft-Hartley law which allows anything less than a strict closed shop if the workers approve it.

By no means has the new law stilled debate on Capitol Hill. It does not cope with most types of featherbedding. Or industry-wide bargaining. These problems will be probed deeper by the Senate-House committee. So will annual wage, productivity, incentive plans, welfare funds.

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What causes industrial peace? The answer to this question is being sought by the National Planning Association, a non-profit labor-management group. Case histories of 15 guinea-pig plants having good relations will be published.

Two other NPA projects: 1. How should the gains of increased productivity be shared? How much should go into wages, profits, investments, lower prices, improvement of product, expansion? 2. Annual wage. What can labor and management agree is feasible and practical?

Wage-Hour office plans for revising "white collar" regulations include upping the $30 weekly salary standard for exempting "executive" employees from minimum wage-hour requirements. Unions have eyes on this move.

Already the CIO United Auto Workers have pulled a "white collar" strike against Hudson. Unionization has been intensified throughout the industry.

Merger of CIO farm equipment workers with auto workers would bolster left-wing faction, hurt Reuther's re-election chances in November. Merger referendum in progress.

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

Business passed the mid-year mark in full stride. Production and employment are running at near-record levels. And there are more and more signs that the much-discussed recession will be no more than a minor dip.

Here's a catalog of some of the most important of these signs.

1. More people had jobs in mid-May than ever before. Layoffs by textile mills, shoe factories, and other soft-goods lines were more than offset by additions to payrolls in durable-goods lines and in trade and service establishments.

2. Department store sales picked up after Easter. Prices are off modestly because of mark-downs and clearances. So the physical volume of goods moving over the counters is on the upgrade again. *Significance is that people are buying in record volumes goods which they think offer fair value. They aren't sitting on their pocketbooks.*

3. The stock market staged a smart late-spring rally. Some market analysts mark this down as evidence that the business recession will be mild. Others doubt that the market is a good business weathervane. But no one can deny that a rising market is a favorable token for general business; it bolsters business confidence.

4. The slowdown in housing isn't as serious as many pessimists thought it would be. Revised April figures show more new housing starts than in April, 1946. And May was also a little above last year. So the experts are now confident that more than 700,000 new homes will be started in 1947.

This will make 1947 one of the biggest housing years since the mid-1920's. But it won't be the million-home year that had been forecast. In short, it will be a big year for homebuilding; but it won't be quite big enough to take up the slack in general business as soft-goods output tapers off.

5. The inventory boom is tapering off with a minimum amount of grief for all concerned. Business inventories have gone up by more than $10 billion in the past year. Higher prices account for half the rise; even so, the rise in physical quantities is one of the biggest on record.

In the past, many businessmen have been thrown for a loss by their failure to keep the inventory situation in hand. They've gone in debt over their heads trying to carry too big an inventory. Or they've been hit suddenly by a wave of order cancellations from customers who are overstocked.

Most businessmen have been amply forewarned this time. So there'll be fewer business failures and less distress selling than ever before. Even so, many businesses, particularly in soft-goods lines, must be content with a smaller volume of business this year than last because their customers are no longer building up stocks.

The point is that the bursting of an inventory bubble has thrown general business into a tailspin many times. But it doesn't look as though it will work that way now. The odds are that business can take the heavy jolt delivered by the end of the inventory boom with no more than a minor setback.

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Don't let this catalog of business strengths convince you that all danger of a recession is past. On the contrary, it merely reinforces the prediction that the coming recession will be mild.

You can't get away from the fact that the soft-goods boom is running out and that durable-goods production can't rise enough to take up all the slack. What's more, the fact that some prices (chiefly foods and other soft goods) have soared sky-high won't make the adjustment any easier.

In fact, the biggest disappointment of recent weeks is that prices of out-of-line things — like meats — have been going up.

In some cases buyers have only themselves to blame for being too anxious to buy even at higher prices. In others, government buying for foreign relief has also been putting pressure behind prices. But in any case the longer the inevitable come-down is put off, the harder it will be to take when it comes.

One of the best guideposts to what lies ahead for business is the second annual Federal Reserve Board survey of people's spending plans.

It shows that people are more optimistic about the economic future than they were last year. More than half of them see good times ahead now as against 35 per cent in 1946. What's more, consumers have $8 billion more tucked away in government bonds and bank deposits. So people still have money and still want to spend it. And they want to buy more autos than can be made this year. These are bullish signs.

But almost half think prices will go down so they'll shop around more. And they plan to spend less on houses and appliances than they did last year. So the going will be a lot tougher in those fields.

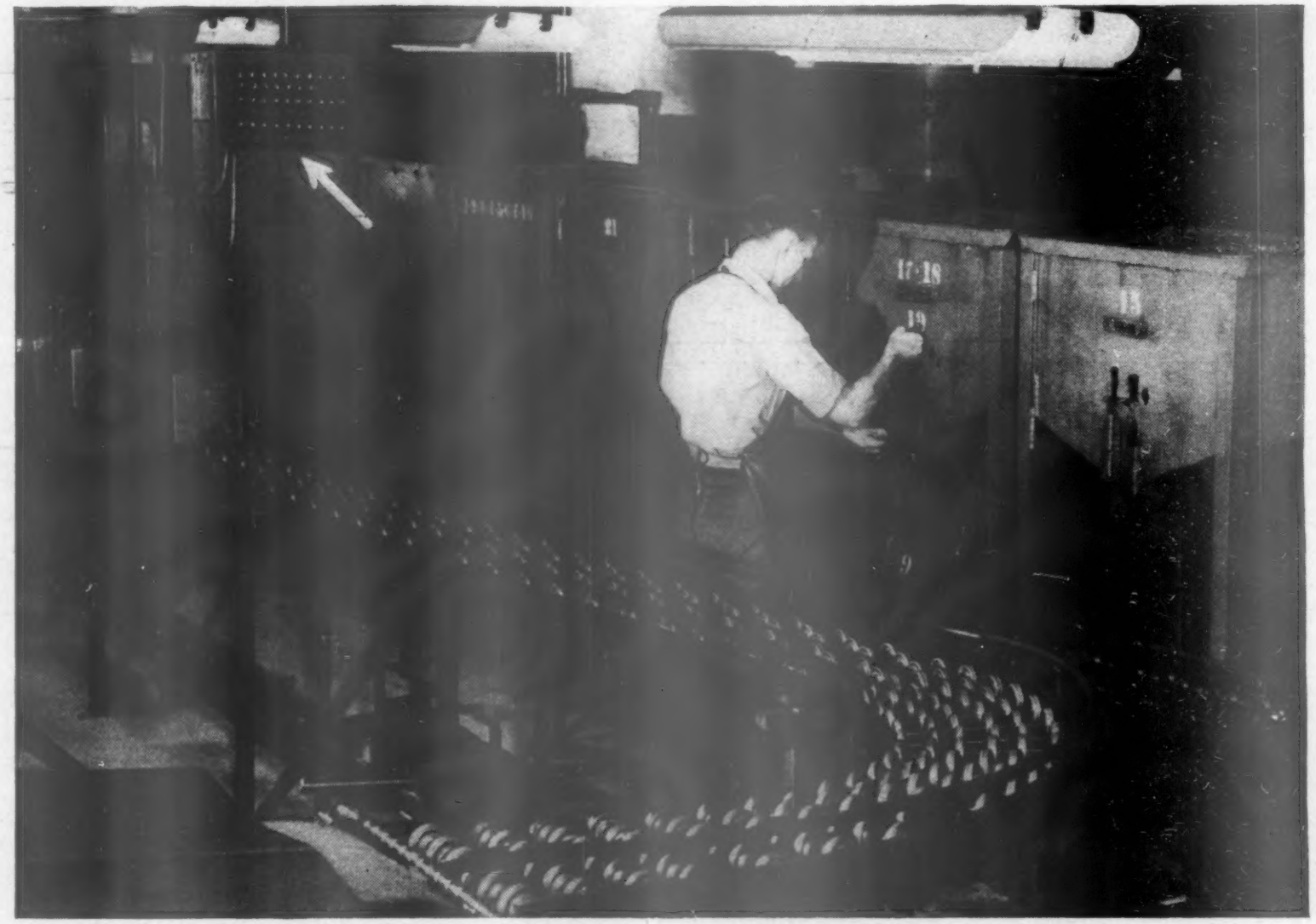
MECHANIZED HANDLING CUTS CYCLE TIME BY TWO-THIRDS

WILLIAM S. WHEELER • FIELD EDITOR, *FACTORY*, CHICAGO

Modernized layout combined with mechanized materials handling has cut over-all production cycle time to one-third at Alemite lubrication fitting division of Stewart-Warner's Chicago plant.

Actual labor savings add up like this—700 hours of elevator time, and 14,000 man-hours per year in simplified timekeeping, scale weighing of parts, stock chasing, and trucking. Productive capacity of the division has been further increased by cutting the distance traveled by work in process—and keeping it all on one floor instead of six.

All operations from the receiving of raw materials through fabrication, secondary machine operations, heat-treating, plating, assembly, inspection, and shipping have been combined into one continuous flow system. Highlights of the new installation are illustrated in the photographs and described on this and the following pages.



1 Fittings are machined in the screw machine department—from 6 to 12 operations—and then are placed in the master hoppers according to type and size. The numbers on the hoppers correspond to the numbers of the workplaces at which the particular type of fitting undergoes its next operation. Attendant, by looking at the control board at the far left (arrow), can tell immediately which work stations require stock. To fill this need, he selects a traveling hopper, again numbered to correspond to the station, fills it from the master hopper, and rolls it down the conveyor toward the control board. Hoppers returning from the workplaces enter this area on the roller skate conveyor in the foreground.

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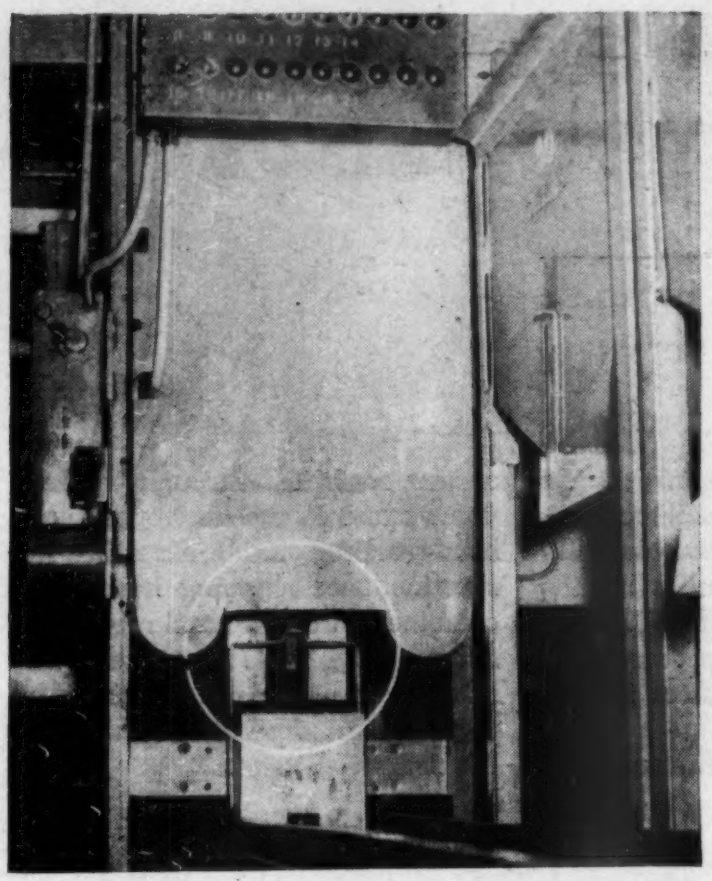
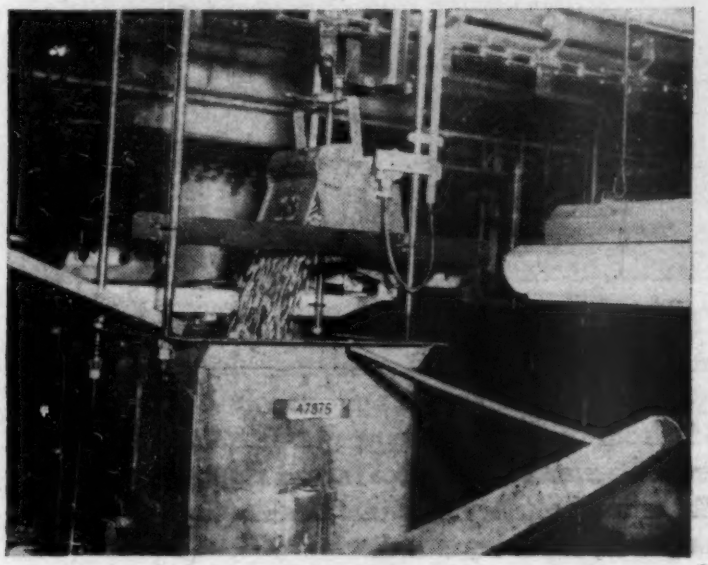


2 Light-indicating control board is the "master mind" of the entire supply system. A scale in the hopper at each workplace, flashes a red light on the board when stock in the hopper reaches a predetermined level. As the traveling hopper passes under the control board, it is engaged by a hook (in circle) which raises it to the overhead conveyor.

3 Lug on the side of the traveling conveyor bin is engaged as bin passes over correspondingly numbered workplace hopper. Mechanism is so arranged that chute feeding work to machine is raised by the attached spring, while the front of the moving bin opens to deposit load in the hopper. When the hopper has been filled to the preset weight, the light on the master control board goes off; until it does the attendant continues to send filled bins to the work station.



4 At the machine, stock feeds directly from the hopper chute to the worker. As the last machine operation is completed, parts are electro-magnetically gaged, thus eliminating manual inspection; substandard parts are automatically detected. Accepted parts are passed through another chute which drains off the machining lubricant and deposits them in a sub-hopper on the side of the machine. By lifting the sliding side (arrow) the inspector releases accepted lots into a mobile floor hopper.

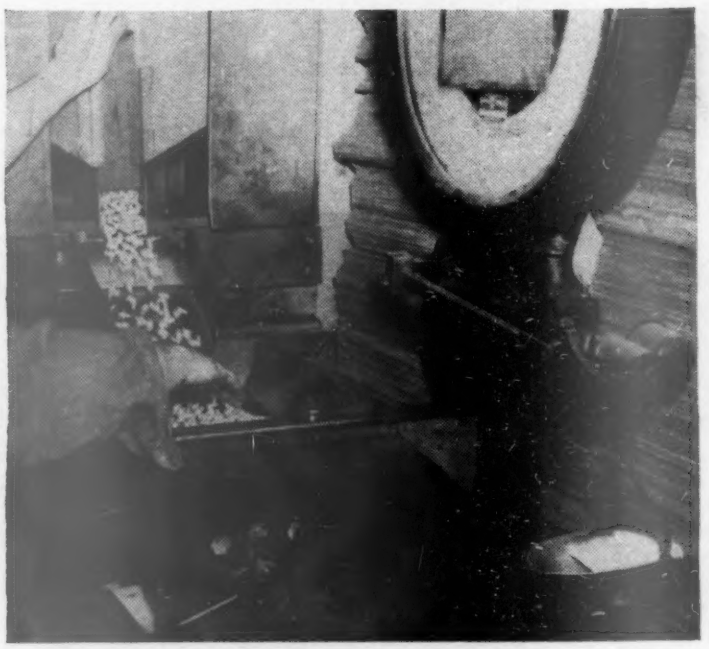
5 When filled, floor hoppers are rolled short distances to vertical lift. No manual lifting is involved at any point; the floor hopper

slides right into the cage. Photograph below was taken from the other side of the lift, shows hopper in elevated position. At this convenient work level, operator can open the sliding panel of the bottom-feed hopper, let parts drop into wire basket. When filled, baskets are pushed along work table to the left, automatically picked up by overhead conveyor which carries them through degreasing and drying. The floor hoppers carry about ten times as much as the previously used totepans, are less apt to spill.

6 Basket trays drop off conveyor line automatically after leaving the dryer. The fittings are then dumped into another group of master bins near the heat-treating and plating department. Flow through this operation, too, is continuous, with the parts emerging in mobile floor hoppers for delivery to final assembly and inspection.

7 Many of the assembly machines utilize automatic loading, and air ejection of parts. The floor hoppers, from the plating room, are placed adjacent to the worker at each assembly machine; the operator merely watches the machine to be certain that the parts do not jam. Fittings are loaded into the hoppers above the machines and they feed in automatically. After completing the cycle of ball and spring insertion, the fittings are air ejected (arrow) into another mobile floor hopper.

8 Final move is to roll the hoppers to the packing area. Here they are placed in another vertical lift, where the bottom feed permits parts to be dumped directly into a suspended hopper attached to pre-set scales. When the desired weight is reached, parts are dropped into the waiting shipping case. Cases roll into position on a conveyor, and, when loaded, continue to shipping platform, two floors down, on same conveyor.



THE "HOW" OF MAINTENANCE FOR 24-HOUR OPERATION

T. M. WALTERS • MASTER MECHANIC, MILFORD (N.J.) MILL
RIEGEL PAPER CORPORATION

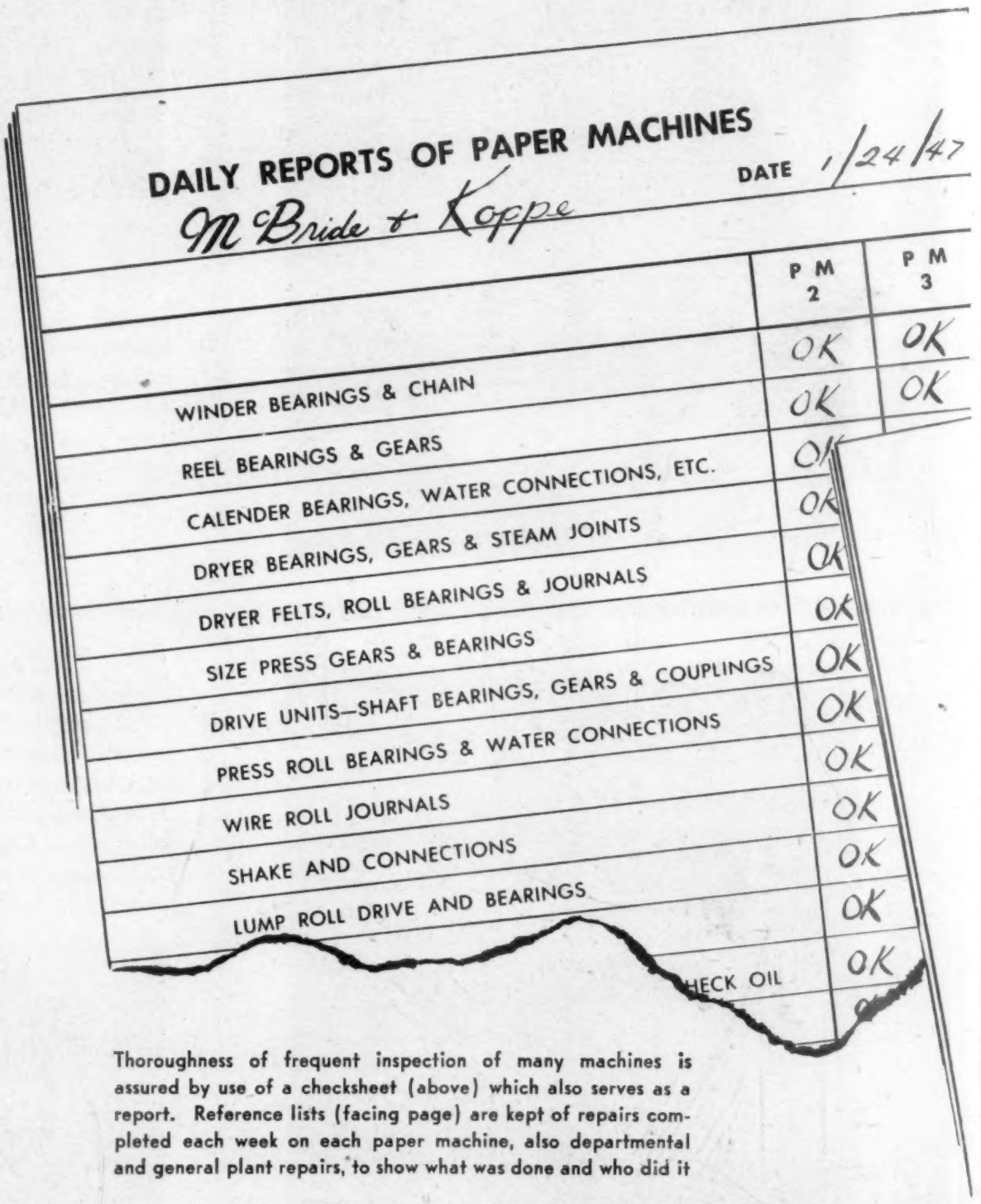
Maintenance of production machinery and auxiliary equipment operating around the clock usually involves a formidable problem. How to avoid costly breakdowns, yet keep the wheels turning, is admittedly a tough question to answer.

But the answer is not unachievable. A system has been used for a long time at the Milford (N. J.) plant of the Riegel Paper Corporation which is proving it can be done —and done well. Best of all, the system is not complicated, but it is thorough. As to results, breakdowns are a rarity, and limited to the "act-of-God" type that no amount of human vigilance could anticipate or prevent. Measured in maintenance efficiency, only 5 per cent of the plant's personnel take care of all maintenance, including buildings, equipments, grounds, and community services.

Continuous Operation

Paper-manufacturing processes in general demand operation on 24 hours a day. 7 days a week. Operating requirements at Milford are typical. Here is located the largest glassine producing mill in the world, on about 12 acres of ground on the eastern bank of the Delaware River. Employees number over 1000.

The plant itself consists mainly of a series of several contiguous 1- and 2-story reinforced concrete buildings, with steel-truss supported roofs, occupying a plot 1200 feet long and an average of 240 feet wide. It produces daily about 175 tons of the finished product from the raw pulp, and consumes over 15,000,000 gallons of water during the process. This means, in addition to care of the actual production machinery, the need for unrelaxed maintenance of considerable auxiliary equipment such as pumps, large pipelines, valves, motors, drives—in short, almost any conceivable kind of mechanical and electrical equipment known to the plant engineer in any industry today.


DAILY REPORTS OF PAPER MACHINES

McBride + Koppe

DATE 1/24/47

	PM 2	PM 3
WINDER BEARINGS & CHAIN	OK	OK
REEL BEARINGS & GEARS	OK	OK
CALENDER BEARINGS, WATER CONNECTIONS, ETC.	OK	
DRYER BEARINGS, GEARS & STEAM JOINTS	OK	
DRYER FELTS, ROLL BEARINGS & JOURNALS	OK	
SIZE PRESS GEARS & BEARINGS	OK	
DRIVE UNITS—SHAFT BEARINGS, GEARS & COUPLINGS	OK	
PRESS ROLL BEARINGS & WATER CONNECTIONS	OK	
WIRE ROLL JOURNALS	OK	
SHAKE AND CONNECTIONS	OK	
LUMP ROLL DRIVE AND BEARINGS	OK	
HECK OIL	OK	

Thoroughness of frequent inspection of many machines is assured by use of a checksheet (above) which also serves as a report. Reference lists (facing page) are kept of repairs completed each week on each paper machine, also departmental and general plant repairs, to show what was done and who did it

The problem of around-the-clock operation is centered in the paper-making department. Here eight machines run continuously to convert treated wet stock, fed to them in pipelines from preparatory equipment, into massive sheet rolls of paper which then go on to the

finishing processes. One paper machine with its scores of drying cylinders, gears, and pipelines, occupies a space over 120 feet long, 12 feet wide, and 15 feet high. Unscheduled shutdowns of such machines are costly from every angle, and therefore to be avoided.

Basis of the system for keeping these paper machines and auxiliary equipment in good condition is an operating schedule which provides for stoppages of 1 day out of 28. In practice, the machines are stopped for an average of 6 hours each week, or 3 hours the first week, and 9 hours the second week, and so on, to add up to a total of 24 hours every four weeks. Variations in weekly allowances depend, as will be shown, on the maintenance work at hand. In addition to the weekly shutdown, a longer shutdown period up to one week is arranged annually for deferred maintenance.

In the method of making the most of the short weekly and longer annual shutdown periods at Milford, however, lies the secret of its good equipment maintenance. A description of the method boils down to four words—inspection, reports, repairs, and records. By continuous inspection of all running equipment to insure proper operation and to detect flaws and trouble in the making, no equipment is permitted to get into such shape that a breakdown occurs. All personnel—operating and maintenance—join hands in this procedure.

Then, by proper routing and accumulation of written reports of these inspections to and into a centralized file, nothing escapes repair that needs attention. Subsequently, repairs are made with regard to allowable time and in order of importance, and, finally, records are kept of all completed repairs. These records have proved valuable in their data and historicity.

Thoroughness the Key

Throughout the execution of these four functions of Milford's successful preventive maintenance program is involved the need for thoroughness. The following description of the actual procedures will show how it is attained with a minimum of effort. While the routine involves principally the paper machines running on 24-hour schedules, the techniques apply equally well to maintenance of preparatory equipment (which operates on a batch basis), and that of the finishing operations (running on an intermittent basis).

Inspection, and plenty of it, is the chief order of the day at Milford.

2/18/47

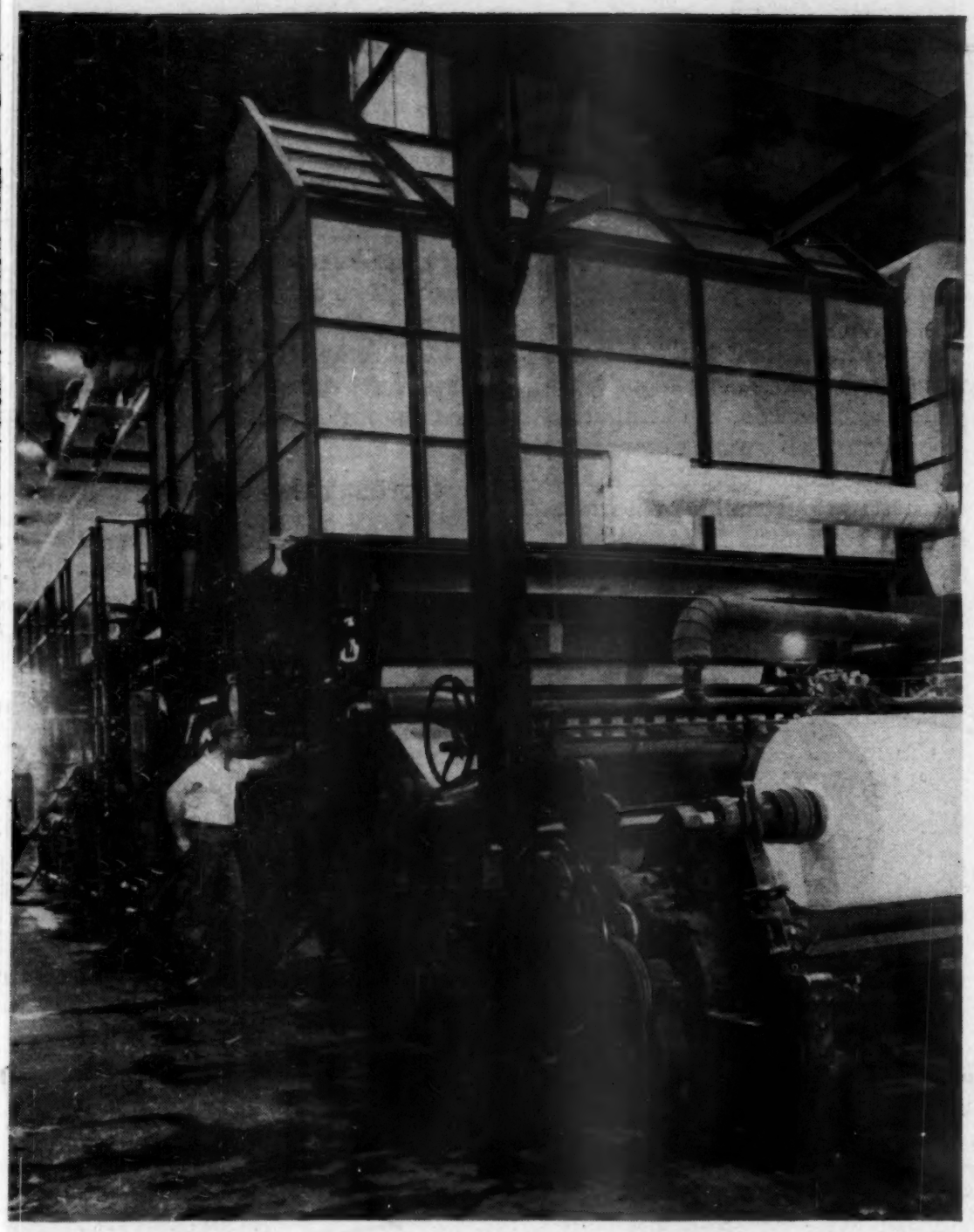
GENERAL REPAIRS

JOB	BY
Repair and overhaul steam traps on paper machines	— Singley
Tie in new river pump	—Trauger, Schmidt, Penyak
Repack all expansion joints on low press steam main in basement	— Singley
Check all screens at river inlet and set	Penyak & George
Repair wood work at outlet from po	
Renew screens on 5000 GPM old r	
Tie boiler feed pump into clear v	
Change 2" valve at Coating	
Babbitt bearing upper pump	
Renew plates and sides in c	
Change 3" steam valve f	
Renew #11 & 12 air co	

Dec. 24, 1946

REPAIRS ON No. 2 PAPER MACHINE

JOB	BY
Inspect dryer gears and bearings, felt roll bearings, and frame bolts	— Arhnt
Add packing on fan pump	— C. Long
Street ell leaking in flange on siphon, 3rd top dryer, 2nd section	— A. Penyak & Grube
Leak in gasket and bolt hole on siphon at flange, 1st top felt dryer	— Schmidt
Renew collar on steam joint, 1st top felt dryer 2nd section	— Schmidt
Renew bushing and pin, upriver part of shake	— Griffith
Set up collar on front side bearing on top sweat dryer, 2nd section	— Red & Edinger
Add packing to bypass pump	— C. Long



Paper-making machines, operating around the clock, present a particular problem in maintenance to prevent costly breakdowns. Inspection, and plenty of it, is this company's answer

During each 8-hour shift the boss machine tender of each paper machine thoroughly inspects all features of its operation. Crew men stationed at various operating points keep alert for abnormalities in their spheres of operation. All complaints or defects are reported in writing on a daily production log. Breakdowns (a rarity) also are logged, showing cause and time lost, to get a complete record of the machine behavior. Thus, operating personnel has a big share in the important inspection routine.

Special area maintenance crews also inspect paper machines daily, using the checksheet shown on page 124. Every morning the master mechanic reviews this checksheet, also the operating log entries, for defects. He checks the validity of all complaints, and enters them in pencil on an accumulative record. Separate records are kept for each paper machine, a[illegible] for other machine groups or departments. As a double check on thoroughness, every week the master mechanic himself inspects all paper machines and adds his findings to the accumulative record. Ultimately, all defects not capable of being immediately adjusted make their way to the accumulative record.

Every month about 50 machines for stock preparation are inspected by the master mechanic and plant superintendent, accompanied by two mechanics. Hand plates are removed from the machines and a drop light is inserted.

A similar internal inspection is made weekly of all pulp bleaching machinery. Mechanics inspect daily and adjust the important stock transfer pumps. Water and field pumps are inspected each shift by a regularly appointed serviceman. In short, all processing equipment is inspected at least monthly, the sole exception being the vacuum pumps which are serviced annually. In many instances these inspections are guided by the use of checksheets, and in all cases written reports flow to the master mechanic's office for accumulation.

Motor Inspection

Motors are separately inspected, over a weekly period, by electrical maintenance men, and adjustments possible to make only during nonoperation, such as on paper machines, for example, are made at the next weekly 6-hour shutdown. All motors are overhauled and cleaned annually.

By agreement with production forces as to the time and length of weekly shutdowns of machines operating around the clock, the maintenance department is able to keep them in good repair. Guided by his accumulative records the master mechanic plans for handling the most necessary jobs first, postponing those he can without jeopardy until the following week or even the annual overhauling. If a repair taking more than 6 hours becomes imperative, a longer time is arranged for, but compensated for by subsequent shorter weekly shutdowns. Every effort is made to stay within the 24-hour shutdown quota per four weeks by balancing shorter shutdowns against a long one. In this way, the production department normally can always rely on 27 days' operation every four calendar weeks.

During these weekly shutdowns the master mechanic lays out the work for each trade, stays right on the spot with his records of jobs to be done, and tries to clean up as many of them as possible. At the same time, about four men inspect machine bearings and other mechanical parts not possible to check.

during machine operation. Similar procedures are followed during any unexpected shutdown. Repair jobs not done one week are carried over on the records to the next. At the completion of each weekly shutdown, separate lists are typed of work done on each paper machine, work in other departments, and general plant repairs. These lists (see page 125) show date, what was done, and who did it. Copies are retained in loose-leaf binders for several years by the plant superintendent and master mechanic.

The procedure for annual shutdowns is similar in principle, only more extensive. Repair jobs that have been deferred to an annual shutdown period because they cannot be done at any other time are carried in a file marked "Complete Shutdown and Repair File." This file forms the basis for planning the work of the "long" shutdown. In this connection, it has been found that staggered long shutdowns of individual paper machines are preferable to complete plant shutdowns, because more men can concentrate on the job, and the arrangement is least harmful to production.

Retention by the plant superintendent and master mechanic of records of all completed repair jobs serves several good purposes. Such records reveal troublesome equipment, and suggest approaches for improvements through analysis of what should have been done, that wasn't done beforehand, to prevent recurrences. They afford a review of the condition of machinery in studies of obsolescence. They substantiate the expenditure of maintenance labor and material whenever management questions the program. They serve, too, as a guide in planning future work, as well as being a check on improper repair work.

Built up over a period of years, the value of this system of maintenance can best be recognized by stating that its abandonment would result in confused operations and an impossibility of directing economical manufacture of the product. This is to say, it's there to stay.

CORRECTION NOTICE

Two numerical errors occurred in presenting the results of Questions 5 and 6 of the survey reported in FACTORY's June article, "Workers Speak Their Minds About Labor-Law Changes" (pages 66 to 72, inclusive).

The *correct* percentages of worker response to Questions 5 and 6 are shown below. Those readers who retain files of FACTORY will probably want each issue to be complete and accurate. Consequently, the corrections are presented below in exactly the form and size in which the answers originally appeared on pages 68 and 69 of the June issue.

It should be noted that on both of these questions, the *erroneous* figures presented a more favorable attitude on the part of workers—from the view of organized labor leaders—than was actually the case.

—The Editors

5. If a strike threatens the public health, safety or interest, should the government be allowed to get a court order to delay the strike for 75 days?

6. Should an employer be allowed to get a court order to stop an illegal strike?

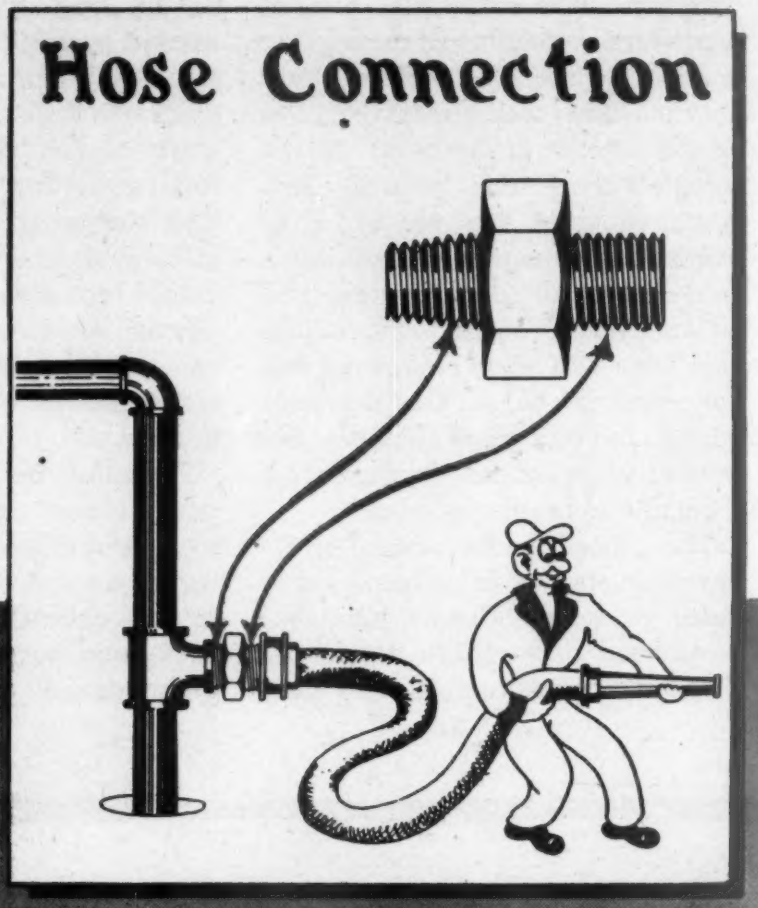
The Questions

Correct Answers

	ALL WORKERS			UNION WORKERS			NON-UNION WORKERS		
	Yes	No	Don't Know	Yes	No	Don't Know	Yes	No	Don't Know
#5	82	13	5	78	16	6	91	4	5
#6	59	28	13	53	34	13	74	14	12

Here are some of the "pictures" that employees see in Seagram's illustrated lecture series. The captions under them explain the story they tell and were adapted from the recorded text that accompanies their showing

EFFECT OF TEMPERATURE ON HYDROMETER READINGS. The percentage of alcohol in alcohol-water mixtures is determined by hydrometers that measure specific gravity of the liquid. Temperature has an effect on hydrometer readings so that it is important to take hydrometer and temperature readings simultaneously



HOSE CONNECTION. A special adapter connects a hose to a standard threaded pipeline. The tapered end of the adapter fits the pipe; the other end fits the hose

FOREMEN TRAIN WORKERS WITH READY-MADE LECTURES

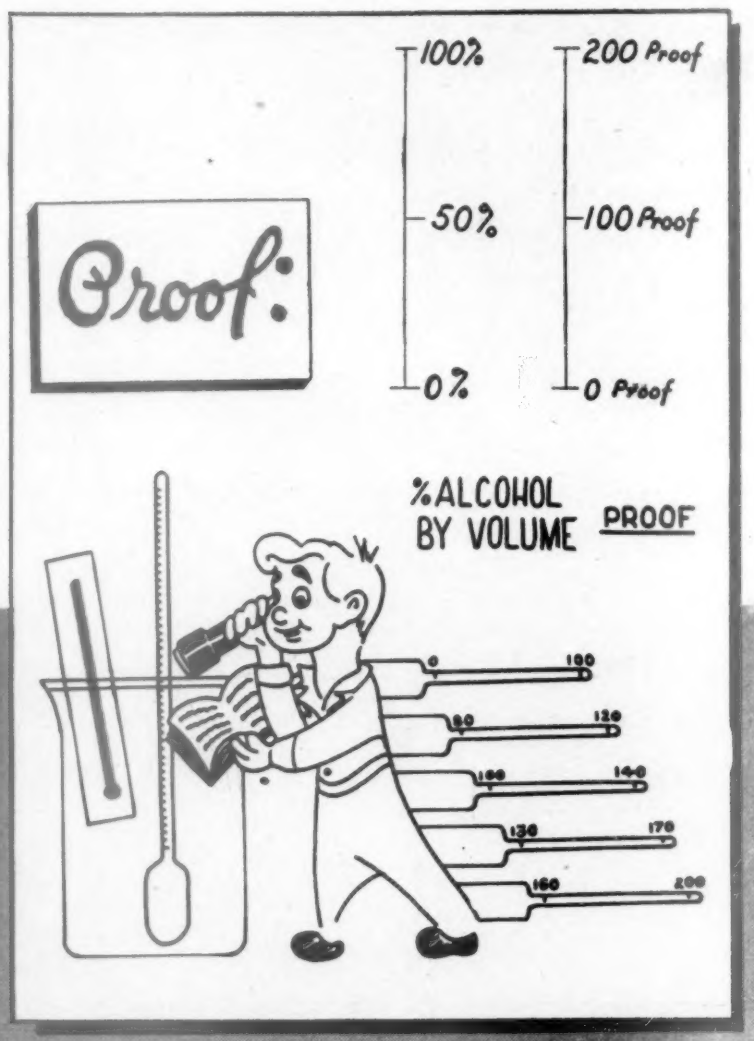
J. MANCZYK • EDUCATION DIRECTOR, PRODUCTION DIVISION
JOSEPH E. SEAGRAM & SONS, INC., LOUISVILLE

Any supervisor who can flip a switch and turn a page can be a good instructor at Seagram's. Made-to-order posters and professionally recorded lectures in the humorous vein are used by this company to teach the serious side of the distillery business to employees.

With these illustrated lectures, supervisors can do a good job of instruction without possessing expert teaching qualifications, and they need not be involved in time-consuming lesson preparation.

The teaching posters are large-scale illustrations, 29x22½ inches, sketched by a commercial artist. Essential points are stressed in a convincing, entertaining manner. The skill of the artist combined with the know-how of experienced plant en-

PROOF. The alcohol concentration of liquors is expressed in "degrees proof" and is, numerically, twice the percentage by volume. For distillates, the proof is determined by hydrometers scaled for various ranges of alcohol concentration



QUALITY. Expert tasters match samples of each lot of goods against a public-approved standard to insure uniformity and high quality. When the tasters cannot distinguish between sample and standard, the goods get quality department approval and pass to the blending department

gineers leads to the production of teaching aids that are superior in content and attractiveness. Humor is used in all drawings because of its proved ability to reach out and take hold of an audience's interest. The supervisor in charge of an illustrated lecture thus finds himself surrounded by a group of employees eager to follow the lecture.

No chance is taken with loss of interest through ineffective delivery. The text of the lecture is recorded by a professional radio announcer. Played back as the illustrations are studied, the recording assures uniform results at every class. Some foremen with initiative and special teaching abilities may improve their own lectures, but the average foreman, with little time for necessary preparation, prefers to use the recorded text and then lead a personalized informal discussion when the recorded lecture has been presented.

No Wait for Lectures

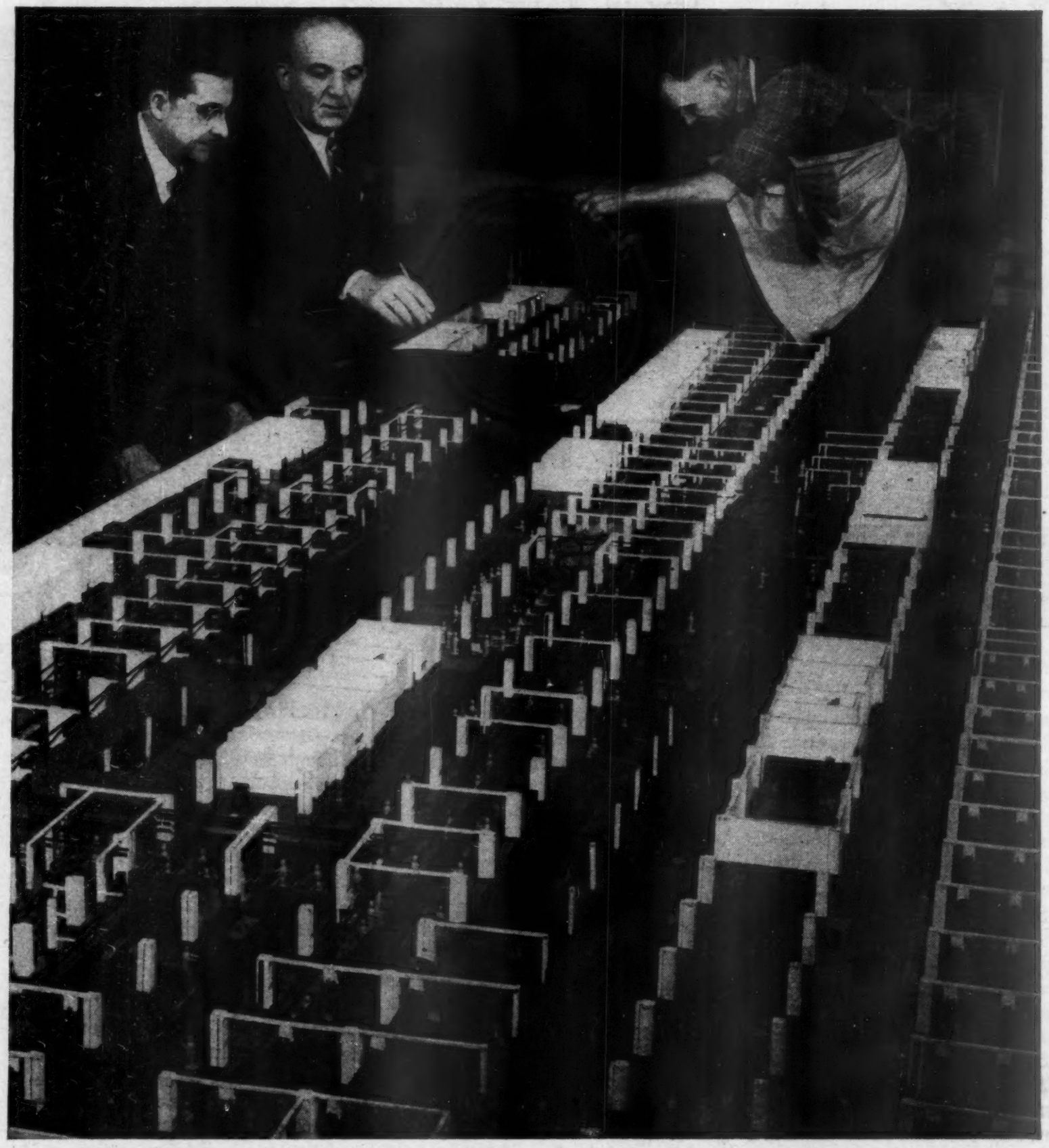
Once a lecture is prepared, it is always available and can be presented at a moment's notice. Lectures are independent of each other, and new employees can begin with any subject and continue attending classes until they have been exposed to an entire series. Notes on each lesson are given to trainees so that they will have study material for future reference.

Enough lectures are made available to assure a continuity in the training program. Aside from their normal use in the training of new employees, these lectures are used profitably to occupy the time of workers whenever a short interruption occurs in production operations.

The first series of lectures included the subjects of *proof, measurements, gaging, regaging,* and *blending,* with special reference given to government regulations. A second series, on *pipes, fittings, valves,* and *vibrators,* now in preparation, was prompted by the interest shown in the first series.

PLANT MODEL INSURES SUCCESS IN LAYOUT CHANGES

WILLIAM F. PIOCH • DIRECTOR OF PRODUCTION ENGINEERING
FORD MOTOR COMPANY, DEARBORN, MICH.



THIS SCALE MODEL OF THE HIGHLAND PARK PLANT IS BUT A SINGLE SECTION OF THE GIANT PROJECT UNDERTAKEN BY FORD

Complete data were assembled on every piece of equipment that is used in the factory. Planning—for the model of the plant—started with this detailed templet layout

To give added realism, models of each product are made in exact detail for each stage of production and assembly

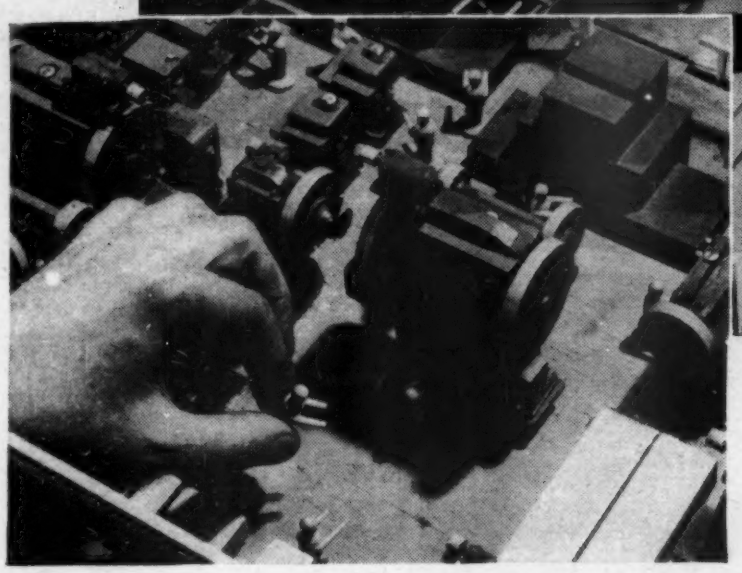
We knew that planning and construction of a scale model of the entire Ford plant would be a major undertaking.

But we also felt that we ought to derive many benefits from three-dimensional layout. And we did. Production men unaccustomed to visualizing layout problems from blueprints have been quick to grasp ideas with the model. Some of the new arrangements we were able to try speedily and inexpensively are already saving many dollars—instead of still being discussed "on the drafting board."

Not long ago a completely new handling method was installed in an entire section of the plant because it could be seen almost immediately that money could be saved, work made easier, and production increased. And the change-over opened up much badly needed floor space for other work.

Since the purpose of the scale model was full visualization of equipment and processes, thousands of details had to be coordinated and many special techniques had to be used to turn out craft-made models of machinery, equipment, and products in the quantities required. The problem of building the model was increased by the degree of completeness desired. Details such as water pipes, drinking fountains, elevator gates, fences, and many other items are included. Even electrical control boxes and panels are positioned accurately on the columns so that

Detailed blueprint of a projected change is checked against the model before an order is released to put the change into effect



Molded plastic figures are placed at each worker station throughout the model. Stations and machines are identified by number

maintenance men will have a guide for placing wiring and machinery.

In one instance, where a crane must be lowered and moved from one side to another, a special working model was made so that engineers and production men could better visualize its operation from the points of view of personal safety conditions, material storage, and layout methods. In another case, a working model was made of a section of floor that must be raised and lowered at a body-drop station.

• Models to represent workmen were molded from plastic to avoid the time-taking carving involved in producing wood models. Large quantities are turned out quickly and accurately. The plastic figures are placed at machines, loading docks, assembly lines, toolcribs—in fact, everywhere a worker would normally be found during a production run.

COLOR IDENTIFICATION CODES

BUILDINGS, FACILITIES, AND EQUIPMENT

MOVING PARTS (CONVEYORS, MACHINES)	YELLOW
FINISHED STOCK	RED
RAW STOCK	BLACK
EQUIPMENT (JIGS AND FIXTURES)	GREEN
OVERHEAD CONVEYOR LINES WHOLLY WITHIN PLANT	BLUE
OVERHEAD CONVEYOR LINES ENTERING PLANT FROM OUTSIDE	YELLOW
CAUTION SPOTS (ELEVATOR GATES, OVERHEAD SUPPORTERS)	BRIGHT RED
OVERHEAD "HOT" CONVEYOR RAILS	BRIGHT RED

MANPOWER PLACEMENT

PRODUCTION WORKERS	PLAIN (WHITE) TOP
INSPECTORS	RED TOP
STOCK HANDLERS	BLUE TOP
MAINTENANCE MEN	GREEN TOP
LINE SUPERVISION	BLUE AND WHITE TOP
GENERAL FOREMEN AND HIGHER SUPERVISION	BROWN TOP

NON-FINANCIAL AWARDS PROMOTE GOOD HOUSEKEEPING

T. E. KELLER • FACTORY MANAGER, GENERAL INSTRUMENT CORPORATION, ELIZABETH, N. J.

Have your workers lost interest in good plant housekeeping? Has the routine monthly housekeeping inspection tour bogged down, or proved boring and ineffective? Or do many of your "dirty-process" departments feel discriminated against in vying for an honorable mention award, and therefore have stopped trying because they feel they have no chance against "clean-process" ones?

These and similar questions are being answered strongly in the negative by a plan for housekeeping inspections and awards recently developed at the General Instrument Corporation, Elizabeth, N. J., to eliminate these very problems. How well the plan is working is attested by the improvement in plant housekeeping within five months of its inception. At the start none of the 15 major production departments, and only 3 of the 17 smaller and indirect production departments, qualified for an award under the new plan. Within five months 11 major departments and 13 others made the "award" grade. Of these, 12 qualified for an award for three successive months. Others are slowly working up to this point.

Success of the company's inspection plan can be attributed to the recognition of some basic faults in its old plan, which led to the adoption of the following principles in the operation of the new plan:

1. Standards of measurement of housekeeping were set up for scoring individual departments. Before, in absence of a norm, the evaluation of housekeeping and sanitary conditions fluctuated with the rise or fall of the best departments, and gave production and sanitation workers nothing to shoot at.

2. Monthly housekeeping inspection committee of four was

By adoption of scoring standards for use by a standing committee of four housekeeping inspectors consistent and reliable comparisons are made for a monthly housekeeping award to each department earning at least 900 points

PLANT HOUSEKEEPING INSPECTION

DEPARTMENT _____ INSPECTOR _____ DATE _____

CONDITION OBSERVED	MAXIMUM POINTS ALLOWED	YOUR RATING
1. CLEANLINESS AND NEATNESS OF FLOORS (floor swept and free of oil, scrap, loose parts, etc.)	250	
2. NEAT AND EFFICIENT STOCK AND MATERIAL STORAGE (orderly, not too high, accessible, and no spillage or broken containers)	250	
3. CLEANLINESS AND NEATNESS OF MACHINES AND EQUIPMENT (orderly flow of work, place for tools, provision for disposal of scrap, rubbish, etc.)	150	
4. CONDITION OF AISLES AND EXITS (adequate width and free of obstructions)	150	
5. FIREFIGHTING EQUIPMENT AND MAIN ELECTRIC SWITCHES (safe access to extinguishers, hose, and main electric switch box controls)	100	
6. GENERAL APPEARANCE (no unnecessary storage of scrap and no personal clothing strewn around)	100	

made to include the safety engineer as chairman and three inspectors not directly connected with any of the departments rated. All four members are permanent, and well acquainted with plant processes and conditions. Before, a rotating committee had been chosen both from the office and non-productive personnel not familiar with plant conditions. This resulted in a variety of impressions, further emphasized by the fact that each new member had to learn the ropes, and invariably registered varying reactions to abnormal conditions.

3. All departments were made eligible to an award if they attained a score of 900 or more points out of a possible 1000. Before, only four awards were available, limited to one for the best process department, one for the best main assembly department, and two for the best subassembly departments.

4. A supplementary award was devised to encourage continuance of good housekeeping habits.

Standards for scoring housekeeping inspections are indicated in the scoresheet shown on page 133, adding up to 1000 points. At the beginning of each inspection, each of the four members is supplied with a quantity of scoresheets, one for each department. The committee proceeds in concert on a tour of the plant, varied each time as to route, and members make their own notes and assign their own scores without collaboration.

Upon completion of the inspection, all forms are turned over to the chairman, who averages the departmental scores. In actual results the individual scores for about three-quarters of all departments range within 10 points (for totals) and for the others vary up to 75 points. As time goes on, variations tend to even out. A thorough inspection of this plant of about 200,000 square feet of floor area requires about 5 hours.

After the scores have been calculated, the chairman edits a list of standings of all departments, and prepares about 90 copies of the report for the factory manager. Distribution of these reports is made down the line, frequently with comments by the factory manager, first to division superintendents, then to department heads, and finally to foremen. Periodically a list of specific unsatisfactory items is handed down to poor performers as a suggestion for definite improvement.

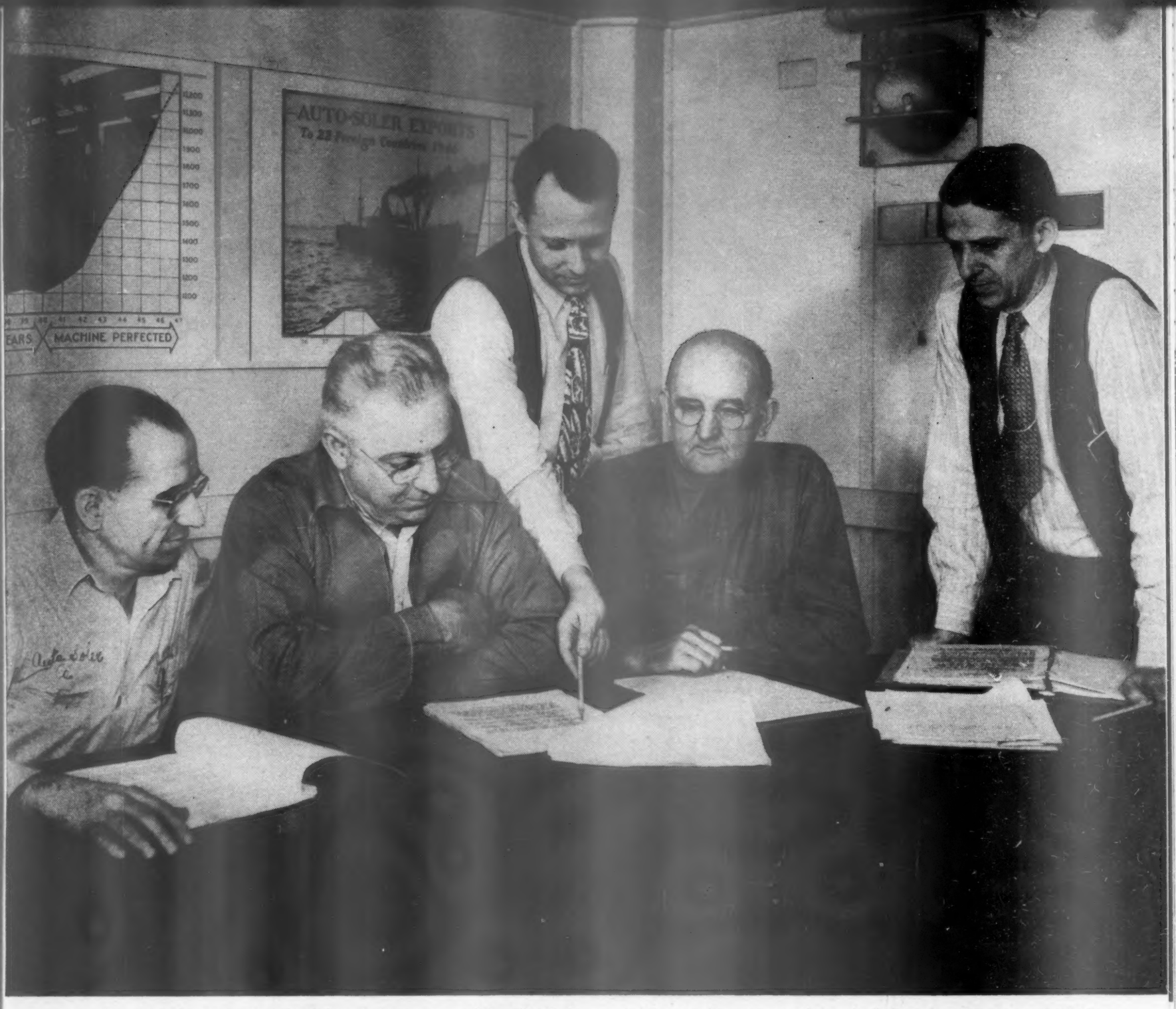
Making the Award

Presentation of the good housekeeping award is made shortly thereafter by the factory manager personally to the foremen of each qualifying department. In the presence of the division superintendent and employees, he reminds the foreman that good housekeeping reflects in the general quality of work, congratulates him, and encourages continuance of his efforts.

The award consists of a colorful wood plaque about 3 feet high depicting in silhouette a Dutch housewife chasing dirt with a real miniature broom. It is suspended in full view from the ceiling by maintenance men, who follow the presentation. On the fourth successive month of award, another similar plaque showing SPIC and SPAN, wife and husband, is presented to that department. Each subsequent successive award entitles the department to the addition of a silver star to the second plaque, but failure to gain an award any month results in loss of this plaque. This procedure effectively sustains interest in maintaining good housekeeping over a long period.

Interest in this plan has been gratifying. Frequently division superintendents inquire of the chairman why an award was not earned, in order to set supervisory wheels in motion for insuring one in their department next time. The fact that monthly scores are steadily rising, despite greater proficiency of the inspectors, indicates that the plan has taken hold and is getting results.

Each month the factory manager personally presents the housekeeping awards to all winning foremen. Four successive months wins a second plaque, here illustrated. This one gets a star for each month that standards are maintained—a potent means of sustaining worker interest



Board of Partners at Auto-Soler studies proposed handbook for employees. Elected by popular vote of all "partners" (workers with more than one year's service), board makes recommendations to management, reviews many of management's ideas

PARTNERSHIP PLAN PAYS OFF FOR EVERYONE IN THE PLANT

WILLIAM H. WILKERSON • PRESIDENT, THE AUTO-SOLER COMPANY ATLANTA, GA.

You really might call Auto-Soler's results the "dividends of democracy."

For Auto-Soler, which manufactures shoe machinery, has a working partnership program that is increasing production with the incentive of greater profit for all . . . workers, stockholders, customers.

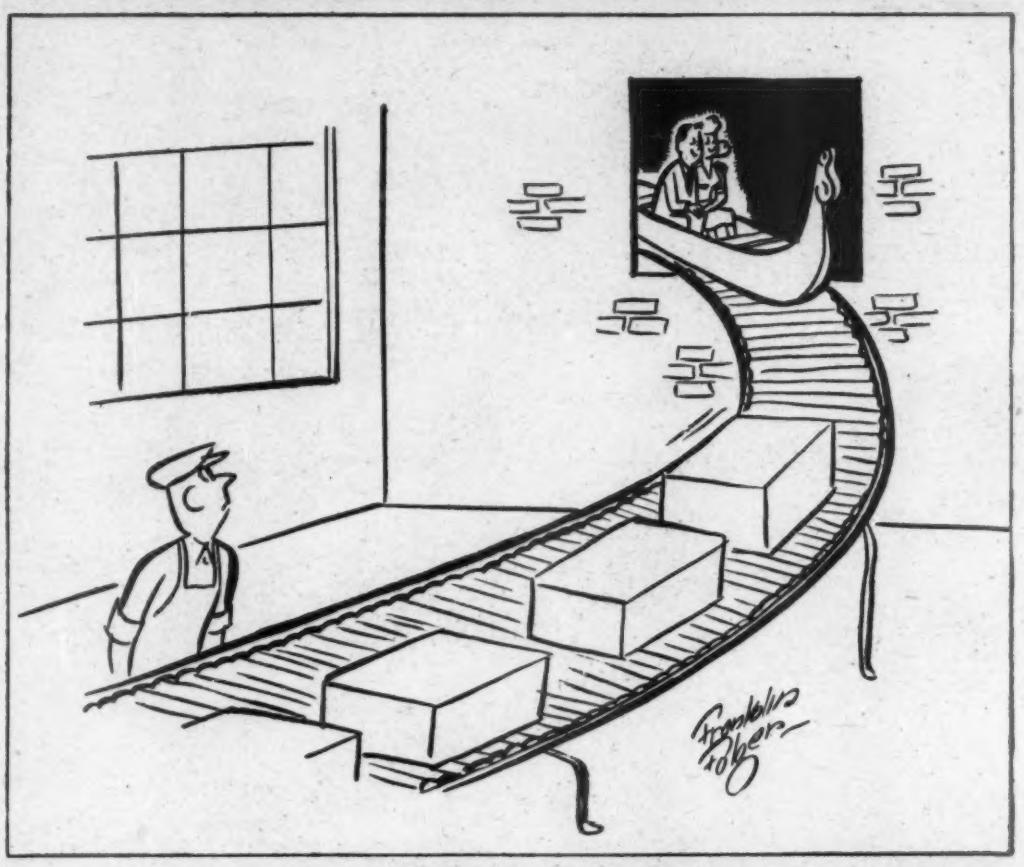
All employees who have worked continuously for a 12-month period automatically become partners. Now there are 105 partners among some 140 on the payroll. Collectively these partners are the employee-governing body and function through a five-man Board of Partners. One yardstick on the effectiveness of the partnership program is that average employee production has increased 271 per cent in five years.

The five board members are "of the partners," elections are "by the partners," and the bylaws permit action in every manner "for the partners."

Original bylaws for the board were created by the company to get the plan moving. But they carried

the proviso that they were to be approved by the partners and could be amended in any way. Composition of the board gives all departments representation.

A primary election, held on company time, nominates ten candidates. A final election, run by an election master and assistants chosen from the people who have less than one year's service and so are not yet partners, selects the five board members. The board elects its own officers, and holds monthly and special meetings. Members of the board are paid $100 per year if the board decides to hold its meetings after regular company hours.



Board Recommends

The board makes recommendations to the partners and to management. It can cite individuals for meritorious service, and it can recommend removal for causes. It is a legislative body and, at times, a judicial body. It has greatly decreased management's administrative and executive load. And it has greatly improved the company's results.

So far this year the board has met after dinner four times a month and has presented recommendations on four major projects. The four, all of which have been adopted, are a profit-sharing plan, a stock-ownership plan for partners, a vacation plan, and an employees' manual.

The board's projects are completed one at a time. Just now its agenda for the next seven months has already been decided. Items listed on it for action, in the order they will be taken up, include a pension plan, a plant newspaper, physical examinations, Christmas gifts, reviewing supervisors' functions, job evaluation program, recreation, employee education, and a credit union.

Recommendations on these projects will be submitted to the management for consideration. So far, all recommendations made by the board have been adopted by management. And top management does not expect to have to use its veto in the future.

The board has actually proved to be more effective than I had hoped. The partnership policy puts enthusiasm into the support given every employee program.

Management can, and frequently does, turn ideas over to the board for study. The board's judgment often has been more competent than top management's would have been.

This competency was demonstrated in the board's first assignment this year. The question was: *Should the profit-sharing plan be continued?* Last year the company paid each partner a bonus of just under 17 per cent on his 1946 income as his share of profits. Should the plan be continued?

Twelve Good Reasons

The board recommended that it should. That didn't surprise me too much—but the twelve good reasons the members presented, did. Every one stressed the fact that it increased productivity and developed teamwork. It was all summed up, really, in what the board gave as its ninth reason: "It enables the company to have more left after paying profit-sharing bonuses to employees than it would have had without the plan." That strikes me as a pretty good reason.

Members of the Board of Partners were asked to attend a Board of Directors meeting to present their recommendations in five-minute talks. They were far more effective advocates than I could have been. Directors, need I say, agreed with them.

This is only one of many board developments that have benefited employees, stockholders, and customers. Others will be coming along as the board completes its studies. The benefits have not been one-sided. Even in the intangible, unmeasurable areas, we can see solid advantages. The plan is building and extending the Auto-Soler philosophy. It develops a feeling of partnership with capital. It gives employees an awareness of their management responsibilities. It develops the interests of employees. It places the government at Auto-Soler in the hands of the governed.

How well the Partnership Plan is working is seen in the company's production records. Average production per worker including even the salesmen on the payroll, was $2985 in 1941. In 1946 it was $8605. This year it will be even higher, I am sure, and next year still higher. We are just getting started.

It pays off for everyone.

POWER SCREWDRIVERS PAID WHEN USED 30 MINUTES A DAY

ALAN KAHN • SUPERVISOR OF ASSEMBLY PROCESSING AND TIME STUDY, BENDIX RADIO DIVISION, BENDIX AVIATION CORPORATION, BALTIMORE

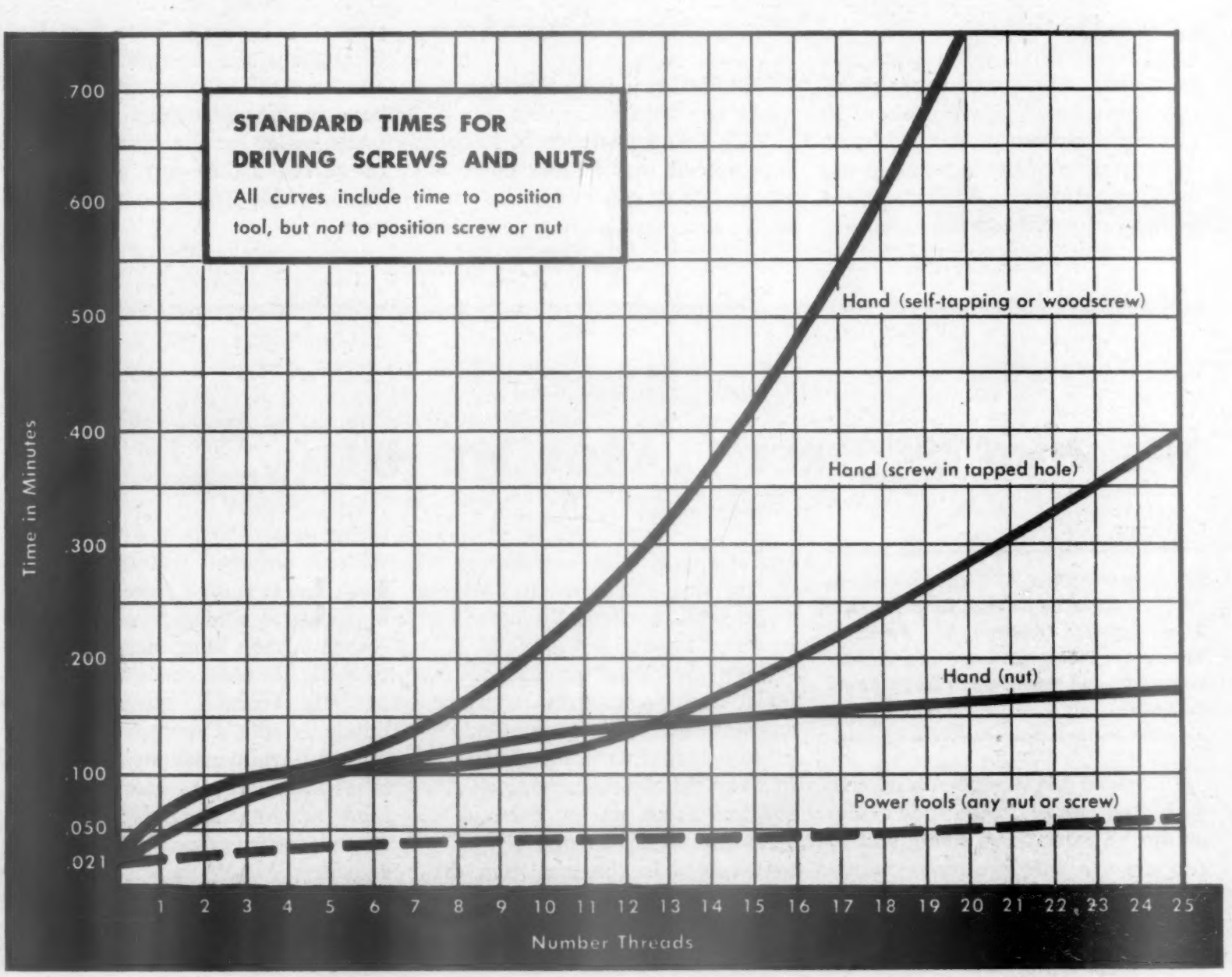
When the processing and time study department at Bendix Radio, Baltimore, recommended the purchase of a few power drivers now and then, no one questioned the action. But when we wanted enough to outfit an assembly line, we had to prove that the investment would be economically sound.

From experience in balancing line operations with both hand and power drivers, the time study men knew that power drivers were faster. But were they *enough* faster to be "economically sound"?

To get the answer, we time studied both hand and power driving of self-tapping screws, screws into tapped holes, and nuts. The results were plotted to show number of threads *versus* time in minutes for positioning the tool and performing the actual driving operation. Time for positioning of the nut or screw was not included, since this is the same for either method of driving. The complete curves are shown in the accompanying chart.

Perhaps the most interesting fact to appear is that, no matter what type of nut or screw is used, a power tool will drive any of them in the same length of time per thread. Hence only one curve is needed for all power operations. Also of note is the fact that after the inertia of the power tool has been overcome at about ten threads, the increase in time is directly proportional to the increase in the number of threads. This is true of hand operations to a limited extent where nuts are involved, but not at all with regard to hand driving of screws.

The studies showed that there are


STANDARD TIMES FOR DRIVING SCREWS AND NUTS
All curves include time to position tool, but not to position screw or nut
Hand (self-tapping or woodscrew)
Hand (screw in tapped hole)
Hand (nut)
Power tools (any nut or screw)
Time in Minutes
.700
.600
.500
.400
.300
.200
.100
.050
.021
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Number Threads

four classes of hand-driving operation; curves were plotted for three of them. The fourth is the case of driving small, self-tapping screws with practically no lead thread. The fact that such screws have only two to four threads made a curve impractical. Actual time for these operations ranged from a minimum of 0.170 to about 0.220 minute, or roughly six times as long as to do the job by power.

The flattening of the curve for nuts is accounted for by the fact that the nut can be run down the bolt by a simple finger motion, with a hand wrench being used to tighten it on the last three or four threads. Nuts that cannot be spun on fall on the curve for driving screws into tapped holes.

Element of Fatigue

As was expected, the element of fatigue played a large part in determining the curve for driving self-tapping screws. Up to about five threads, the curve does not differ appreciably from that for tapped-hole driving, but after that point there is a particularly sharp rise in the curve. Beyond about 10 threads, the time increases almost as the square of the increase in the number of threads. This is of particular importance in the balancing of line operations where long elemental times must be avoided.

Once the facts had been obtained, it was not difficult to determine the soundness of buying a power tool for any particular operation. It was merely necessary to read from the curves the saving in time for the operation, multiply by the number of times per day the operation is performed, and then convert this time to dollar savings per day. Dividing the cost of the power tool by this figure gives directly the number of days of operation required to amortize the purchase.

Rather than work this computation for each of the operations in the proposed change-over at Bendix, we assumed almost the worst possible conditions—that every operation consisted of driving a nut or screw of five threads. This had the additional advantage of being a point at which all three of the "hand" curves very nearly coincide. On this basis, it was found that the power drivers would pay for themselves in approximately six months, if each were used about 400 times per day. Obviously, where more than five threads are involved, the usage can be considerably less.

With this knowledge at hand, it was agreed that in any operation where 500 or more screws or nuts daily are driven four or more threads, a power tool is not only economically sound but also a necessity. And, because of the fatigue factor involved in the driving of self-tapping screws, it is felt worth while to provide power drivers even in cases where the amortization period is longer. In addition, one general conclusion can be drawn—*if a power tool can be used 30 minutes per day, it pays to install it.*

As a result of these studies, power tools have been installed throughout the assembly lines at Bendix radio. Dollar savings have been registered, work has been made easier for the operators, and completed radios are coming off the assembly line at an accelerated pace.

Every Month . . .

AMONG THE ADVERTISING PAGES, these valuable aids to low-cost production: the plant operation man's guide to **WHAT'S NEW IN EQUIPMENT** (page 150) . . . a summary of **LABOR DEVELOPMENTS** (page 222) . . . things **YOU WANT TO KNOW** more about (page 212)

THE KIND OF "FREE" LABOR WE NEED

An answer to the AFL advertisement, "A Free America Cannot Exist Without Free Labor," written by Frederic Kammann, vice-president, Roy S. Durstine, Inc., and published at his personal expense

As one of 134,000,000 Americans, I am simply a member of the public. I work for a living and to support my wife and five youngsters.

I share with the rest of the public, including all members of labor organizations, the experience of having my affairs, both business and private, periodically messed up by "free" labor.

They are "free" to cut off my fuel, "free" to interrupt my communications, they stop my food deliveries, they shut off my electricity. In short, this free labor doesn't give a damn about me or even about their own members who happen to be involved in the particular disturbance of the moment.

I agree that we need free labor; free to work where it wants to work without enforced tribute or coercion; free to raise a voice in its own organization affairs; free to vote by reason rather than dictation; free to settle its differences with management without appointing the public as official goat; free to turn out a full and honest day's work if it so chooses; free to recognize that labor costs are a part of all prices no matter who propagandizes to the contrary.

That's the kind of free labor we need, and that's the kind that actually did build up this country.

FLOOR CARE AT LOW COST

H. C. HENDERSON • PLANT ENGINEER, RCA TUBE DEPARTMENT
LANCASTER, PA.

Keeping 318,000 square feet of industrial floor space soil-free and bright pays off at RCA-Lancaster. To this large tube-manufacturing plant, "ballroom" floors are a production asset.

Special floor-maintenance methods, developed at the plant, aid dust control and lower tube-scrap loss. What's more, the program that set the high, spotless-floor standards is operated at low cost.

The use of vacuum-equipped floor machines and the need for superior floor maintenance at RCA were directly linked with dust control, an important factor in tube manufacture. A fine luminescent powder forms the basis of the screen in an RCA television tube. It is settled into place in manufacture by a carefully controlled sedimentation process. During this operation, even minute particles of dust or dirt may mar the screen pattern and the result will be the rejection of an expensive tube.

The first steps in developing a floor-maintenance program were taken in 1942 during construction of the plant. Because wartime demands for electron tubes made early operation imperative, floors had to be put in proper condition immediately to allow faster placement of equipment, and had to be kept that way by methods that could be depended upon not to slow down production or interfere with traffic.

Working fast to meet these needs, RCA maintenance officials studied soilage conditions, decided on standards, selected floor cleaning machines, and trained a maintenance crew. The floor-care program now covers 28,000 square feet of hard maple flooring (areas devoted to tube manufacture, assembly, and inspection) and 38,000 square feet of asphalt tile (areas reserved for personnel offices, two cafeterias, a kitchen, and a library).

HOW FLOOR-CARE PROGRAM PAYS OFF AT RCA

- 1. Bright, hard, dirt-resistant floor finishes are available in all departments, including those with manufacturing areas, presses, and similar equipment
- 2. Special high-speed sealing and waxing methods provide wear resistance to traffic and trucking. Floors stay smooth, light-reflective, yet non-slippery
- 3. Floors can be mechanically dry-cleaned, sealed, and waxed during working hours, causing no interference with traffic or production
- 4. Special soilage problems (glass and wire fragments, oil discoloration, grime from machines) are solved by using special materials, equipment, or techniques
- 5. Over-all cost of floor maintenance is low, including expense for labor and materials. A worker, after training in RCA's floor-maintenance techniques, can care for over 70,000 square feet of floors daily

Asphalt-Tile Maintenance

Because no serious traffic or soilage problems are involved, asphalt-tile maintenance is comparatively simple. The maintenance cycle starts with the removal of old wax. This is seldom necessary, but is required for a complete, new coating of wax after several months' traffic has worn the old wax thin.

Soap and water are applied to loosen dried accumulations of wax. As a rule, this is done by hand, but where old wax deposits are grimy, hard, and fused with other material (such as glue spilled in the library or syrup in the cafeterias), one of the revolving-drum floor machines may be used. Equipped with a 16-in. scrubbing brush, this machine rapidly removes grime and wax deposits, cleaning tile surfaces and border crevices as well. Rubber splash shields prevent excessive splattering of scrubbing solutions.

Next step is application of a high-grade liquid water wax. It is applied with mops or V-shaped applicators that permit rapid, uniform spreading of the wax.

When the water wax is dry, a thin, wear - resistant protective coating of hard wax is applied with the floor machine. This is a fast job that does not interfere with traffic. A 16-in. brush is inserted on the floor-machine drum, in contact with a cartridge of bar wax. As the brush revolves, a fine powdery deposit of wax is applied to the floor and buffed to a high luster.

The effect of this operation in routine maintenance is to clean, wax, and polish at the same time. Ordinary soilage and stains are whisked off, dust is picked up by vacuum, and a smooth, protective wax coat-

ing is put in place to withstand heavy traffic.

The final step in asphalt-tile maintenance is daily sweeping with a dry, cotton, pusher-type mop. Use of soap and water is necessary only at long intervals for complete refinishing. Cleaning-polishing-waxing with the machine is usually needed only twice a month, except in aisles where traffic is heavy.

Wood-Floor Maintenance

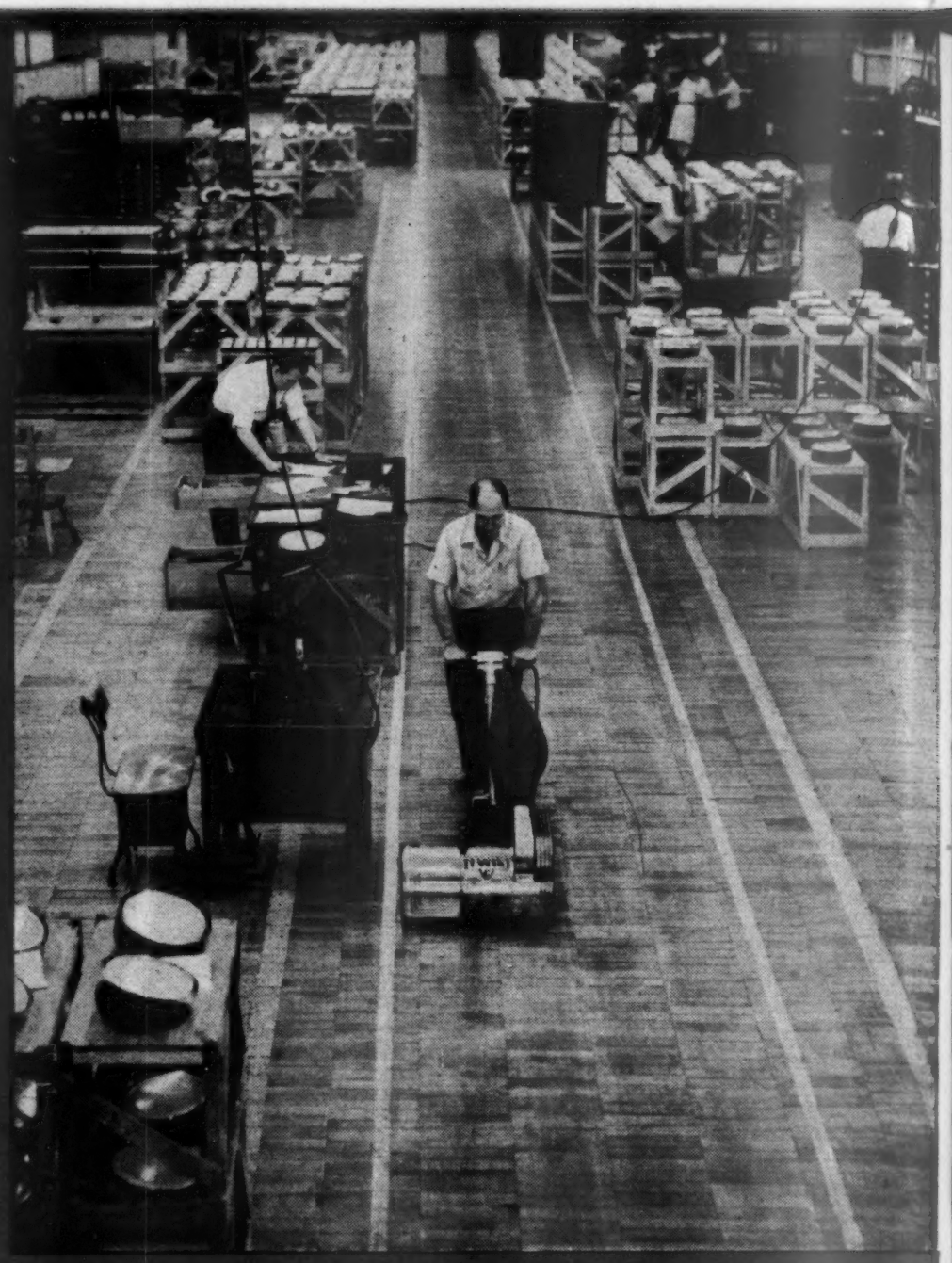
The wood-floor maintenance cycle starts anew every six weeks. It centers around a special program of sealing, waxing, and dry-cleaning.

First step is application of a penetrating floor seal containing a small amount of solvent. The seal binds and hardens the wood fibers of the floor. To avoid interference with production, seal is applied sparingly over a small area at a time, using a mop wrung out almost dry. It is immediately buffed by a floor machine equipped with a steel-wool roll. As the cylinder of steel wool revolves at high speed, it forces the seal, by friction and pressure, into topwood fibers of the floor. Rough, frayed fibers are removed to leave a smooth, clean surface.

The second step is immediate waxing with a floor machine to lay down a hard, smooth, protective finish over the seal. The method is similar to that used on asphalt tile, except that hard bar wax is applied with a steel-wool roll. The rolls are factory-wound and self-cleaning. Traffic need not avoid the freshly sealed floor, because grime or marks tracked on newly sealed surfaces are instantly removed by the waxing machine.

Techniques developed at RCA make it possible to lay a good coat of wax as fast as the operator can push the floor machine. Operators are trained to use correct pressure in waxing to produce a safe, nonslip surface.

The third step in the cycle of wood-floor care is high-speed, steel-wool dry-cleaning with a floor machine. The operator guides the machine down factory aisles, along walls, and close to presses and plant equipment. Work is done during regular hours in full traffic areas.



The waxing machine with 16-in. accessories in use. Note bright, light-reflecting aisles and floor areas under desks and benches

The machine for this job is equipped with a 16-in. steel-wool roll mounted on a revolving drum. As the drum revolves, the cylinder of steel wool removes grime from floors by a burnishing action. Heavy soilage, metal tube parts, glass fragments, wires, and so forth, are hurled past a soilage deflector plate and into a removable hopper built into the machine. Lighter dust and dirt are controlled by a built-in vacuum system.

The speed with which floors can be dry-cleaned may be judged from these figures: In one month, 40,244 square feet were cleaned in 73.5 hours, a rate of 547.5 square feet per hour. Coverage per roll of steel wool was 4024 square feet.

The most important step in wood-floor maintenance—yet it is the easiest of all to accomplish—is daily sweeping with a treated, dry cotton mop. Surface dust, dirt, wire fragments are thus collected and picked up in dustpans.

Equipment

Principal equipment used by RCA's maintenance staff consists of three floor machines of the semi-self - propelling, revolving - drum type. One machine is designed to accommodate 16-in. accessories and is used for sanding, self-buffing, steel-wool dry-cleaning, and power sweeping. The other machines take both 8- and 16-in. drum accessories and can be used on wood and asphalt-tile floors with equal ease. The smaller machines are used for tile-floor scrubbing, steel-wool dry-

Powerful magnets pick up metal particles before they can be ground into the floor

Areas under machines are cleaned by buffing them with No. 3 steel wool wrapped on a mop head and dipped in seal-cleaner

cleaning, and for the one operation of cleaning-waxing-polishing.

All the machines have drums that operate at two speeds (approximately 850 and 1725 r.p.m.), can work almost flush with walls, and are easily operated by one man.

To make machine operation more efficient, RCA supplies each operator with a handy two-wheel cart that permits one-trip maintenance when cleaning or waxing in remote sections of the plant. The supplies carried by the cart usually include such items as floor-machine accessories, floor seal, wax bars, steel-wool rolls, extra electric - cord lengths, dustpan, brush, push broom, mop, refuse bucket, wrenches, scrapers, and small tools.

Training of floor-machine operators is considered of great importance from the standpoint of both maintenance costs and quality of work. Training develops individual speed and efficiency, and assures uniform maintenance standards and "color" on all floors in the plant.

Special Soilage Problems

Special soilage problems have been solved, with considerable success, by preventive measures.

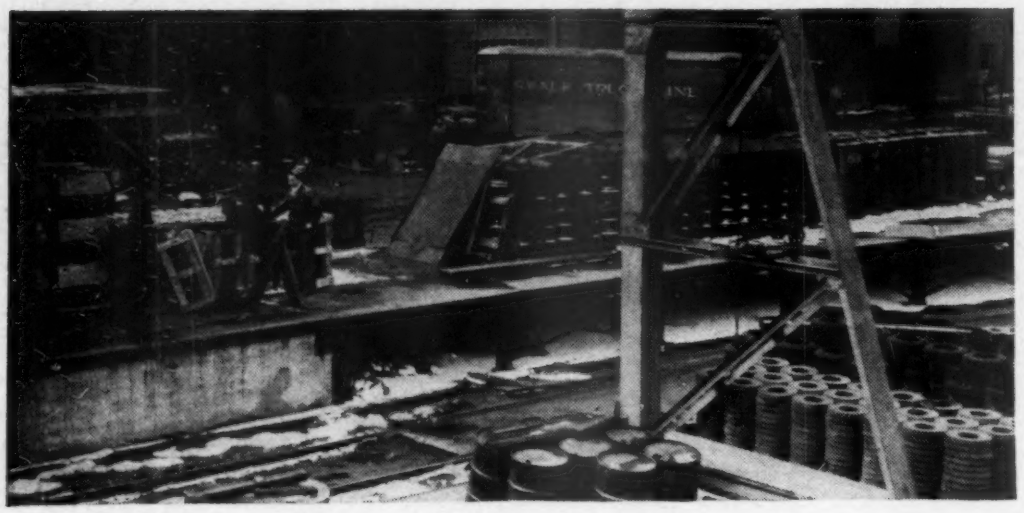
RCA's wood floors are set in asphalt mastic. In very oily areas, the mastic is partially emulsified by contact with oil, and the result is a dark stain that penetrates the wood. As an experiment, RCA removed 125 square feet of maple flooring in its punch press section and laid new flooring over a specially compounded aluminum mastic. This section, in use now for a year, retains its original appearance. The advantages of the aluminum mastic to date have been very apparent—oil does not emulsify it, and the floor remains free of discoloration.

For paints and similar coatings spilled on the floor, solvents are satisfactory if used as soon as the stain occurs. The floor that is acid-stained, however, must be sanded and resealed for a better finish.

For cleaning under machines and workbenches, a small piece of No. 3 steel wool wrapped on a mop head and dipped in floor seal cleaner is often used. This is satisfactory in areas where it can be buffed. Elsewhere a soap solvent mixed with water may be used, although it tends to leave raw areas on the floor surface.

OPERATING SHORTS

Readers are invited to contribute brief articles, illustrated when possible, reporting out-of-the-ordinary operating accomplishments. Accepted articles will be paid for



An extension of 60 feet on the receiving platform, constructed of scrap material, allows four cars to be unloaded instead of two, at the White Motor Company plant

EXTENDED RECEIVING DOCK REPAYS COST IN 6 MONTHS

CHARLES SOUTHWELL, White Motor Company, Cleveland

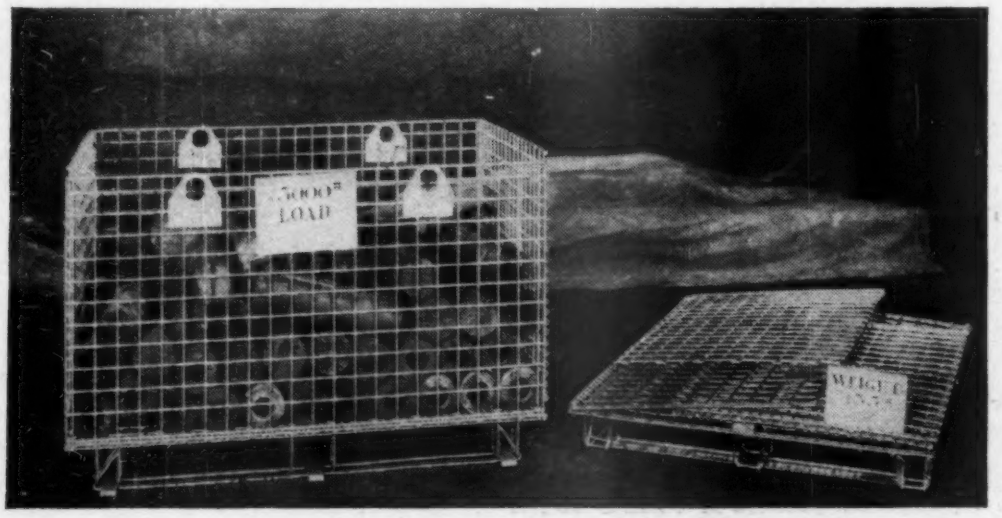
Boxcars delivering raw materials often had to wait many hours before being unloaded at this plant because of the increased amounts of materials being delivered every day. This not only resulted in the delay of delivery of badly needed stock to the production department, but also in the accumulation of appreciable demurrage on the idle cars.

At a cost of about $900, and using scrap material, the receiving dock was extended 60 feet, and it is now possible to unload four cars at a time, instead of two.

The average demurrage formerly paid on idle cars was $240 per month, a total of $2880 per year. The new extension has reduced this amount by half, or $1440 per year, and, since this saving will continue, the expenditure on the extension will be repaid many times.

COLLAPSIBLE PALLETS SAVE HANDLING

Collapsible pallet container developed by Westinghouse Electric Corporation eliminated four of six manual handlings in the interplant transportation of iron castings. Final design was the result of experiments with scale models of both wood (too heavy and bulky) and steel mesh. The container now in use offers these advantages; (1) Tare weight if less than 5 per cent; (2) small size when collapsed reduces cost of returning empty containers; (3) eight-way entry pallet base provides maximum flexibility for fork-truck handling; and (4) undercarriage construction distributes load, permits unit to be moved on roller conveyors. And actual experience has shown that parts broken in transit are down from 5 to 2 per cent, a net reduction of 60 per cent.



PERISCOPE SPEEDS AUTOMATIC OPERATION

A periscope, enabling a man to see through floors and around corners, speeds an automatic operation at Congoleum-Nairn, Inc., Kearny, N. J. The periscope, designed by a shop mechanic and built by a tinsmith, uses ordinary plate glass mirrors enclosed in a duct.

Mirror above the periscope enables operator to see contents of a receiving bin two floors below

The operator of a weighing and blending machine on the fourth floor can look into the periscope and see the contents of a bin on the second floor. He is thus guided in controlling the flow of composition that is gravity-fed to a mixer on the third floor, carried by belt conveyor and chute to the second floor, and removed from the receiving bin by a worm-gear conveyor.

The periscope duct is sealed against dust so that mirrors do not require cleaning. Only lighting needed is an electric bulb over the receiving bin.

Before installation of the periscope, the services of a helper on the third floor were required to make sure that continuous flow of composition was regulated properly.

SIMPLE CHANGE SPEEDS HANDLING, CUTS SPOILAGE

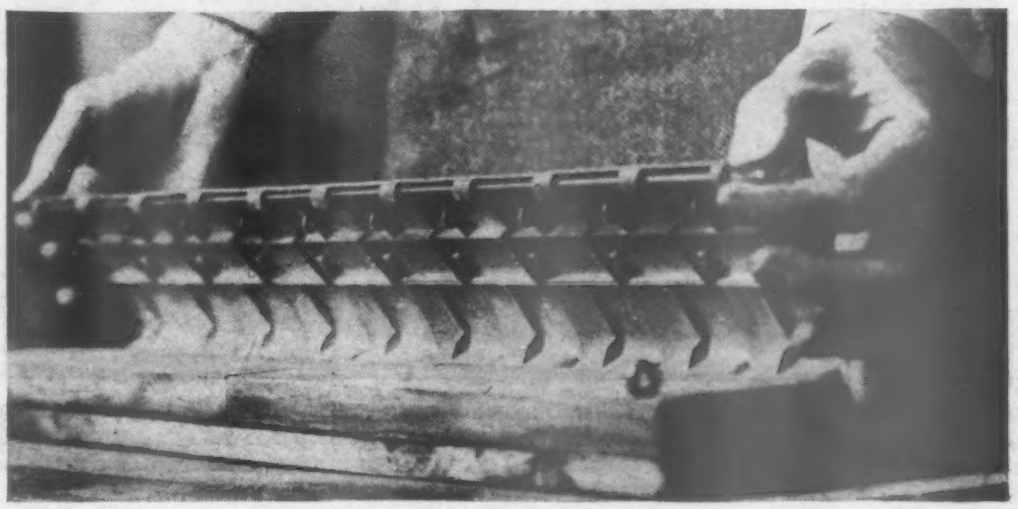
HOWARD B. ROWE, Nashua Gummed & Coated Paper Company, Nashua, N. H.

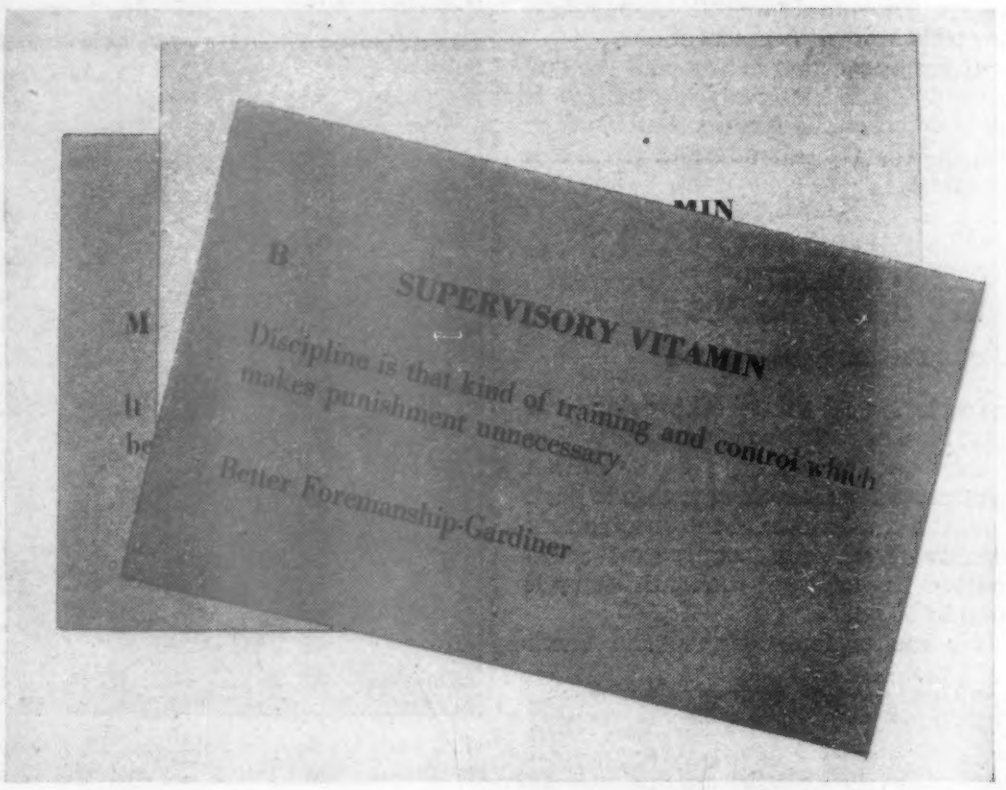
The handling of small die-cast covers for tape-dispensing machines presented a real problem in our plant until a simple change in design made mass handling possible.

These covers had to be painted, and a name decal applied to each one before they were assembled on the machine itself. In their original form, the small pieces were awkward to handle, and, after they had been painted, were often chipped and scratched in transportation.

Cutting away a part of a rib on these small die-cast covers made possible the running of a rod through the hinge holes so that ten could be handled at once while processing, and, after finishing, racked up 300 at a time for cartage

By cutting away a part of a rib between the two hinge holes, it was possible to run a rod through these holes. With this rod, ten pieces could be picked up at once, put through the painting operation, then, after drying, positioned on a holding jig for application of the decal. The covers still on the rods could then be placed on a carrying rack holding 300 units, thus eliminating any danger of damage to the finished pieces. In this way, a great deal of handling time was avoided, and spoilage reduced almost completely.




SUPERVISORY VITAMIN
Discipline is that kind of training and control which makes punishment unnecessary.
Better Foremanship-Gardiner

"Supervisory vitamin" cards are given out to foreman at the training courses at Esterbrook Pen Company to stimulate thinking and to drive home points covered in the lectures

TRAINING "VITAMINS" BUILD SUPERVISORY MORALE

DAN GRADY, General Superintendent, Esterbrook Pen Company, Camden, N. J.

Foremen attending the training course at the Esterbrook plant are given "supervisory vitamins" to stimulate thinking and drive home the points covered in the lectures. These "vitamins" are in the form of short, pungent statements embodying good management principles affecting human relations, productivity, and economic truths. The cards are printed on index-quality paper of various pastel colors, 2¼x4 inches in size.

These "thoughts for the day" are lettered alphabetically to govern their distribution, and one is given out at the end of each meeting. Typical of the messages that appear on the cards are: "The most economical wage is the one which serves as a real incentive for a man to put forth his best efforts"; It is not so important to know the efficiency of one girl as to know how this girl affects the efficiency of the group with which she works"; and "Take pains to see that every new man gets started right. There is no more important lesson for any foreman to learn than this one."

SUGGESTIONS AIRED AT WEEKLY FORUM

Open forum meetings are sponsored at the Kansas City, Mo., plant of Swift & Company for both workers and management. Here anyone with a suggestion for improving over-all plant efficiency gets up and outlines his idea. Company officials listen carefully, and

reply then and there, commenting favorably or with reservations.

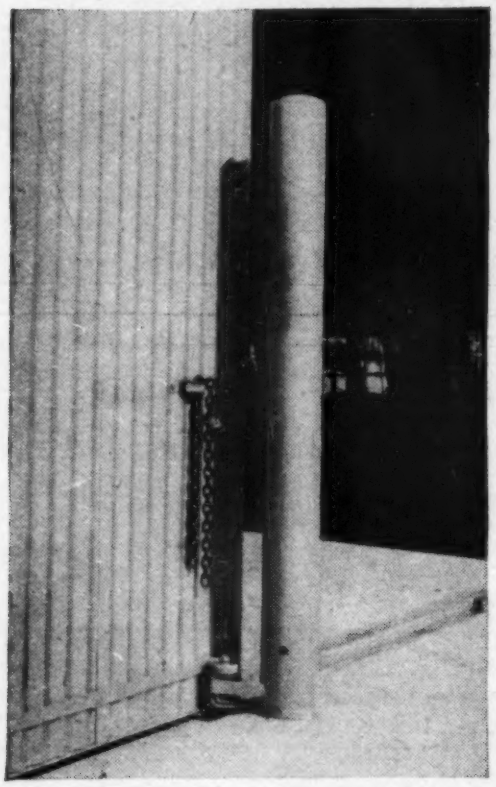
If the suggestion is accepted the one who presented it receives a bonus. If it is rejected, he knows that his idea has had a fair chance and a careful hearing.

SNUBBER POSTS SAVE SHOP DOORS

ELTON STERRETT, Houston, Tex.

In a plant where the working floor was just high enough above ground level to insure proper drainage, it was often convenient for incoming trucks to back into the center aisle of the shop so that the overhead crane equipment could unload the cargo at the spot where it was to be used.

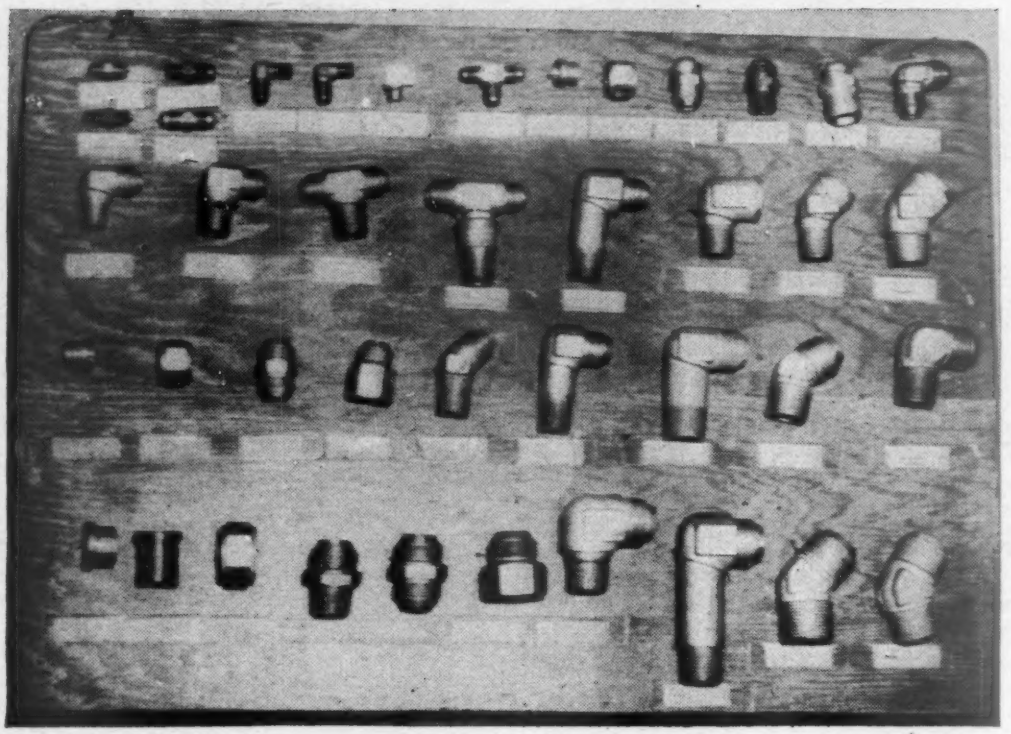
No matter how careful the truck



drivers tried to be, now and then one would back his truck into one of the sliding doors, bending it, and either jamming it on its overhead track or distorting it so that it would not close properly.

To safeguard the doors, two snubber posts were set up in the concrete of the drive, one in each side of the door. The posts were made of extra heavy 6-in. pipe, 6 feet above ground to their tops. In each was set a core of steel reinforcing rod, extending to a depth of 1 foot below roadway level. The pipe was then filled with concrete.

The posts thus formed were stiff enough to withstand the impact of a slowly moving truck or trailer, and effectively protected the relatively light doors against damage. Advantage was taken of the location of the posts at the extreme end of the door travel to provide a mounting for the door guide rollers which kept the doors close to the guide bar set into the floor, thus preventing swinging of doors in a wind.



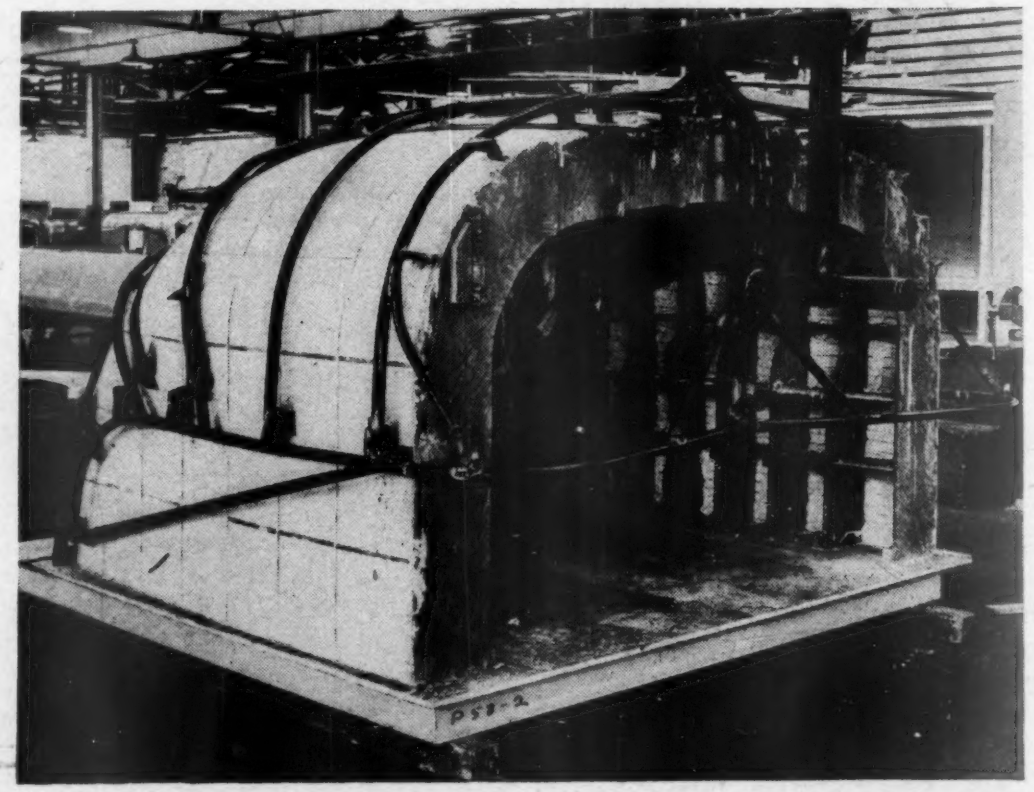
When parts are received from suppliers, they are quickly identified by comparison with this board, on which all small fittings are mounted, together with name, part number, and specifications

FITTINGS BOARD FOR QUICK CHECK OF PARTS

A fittings board, developed for use in the small parts inspection department of the Cleveland plant of the Towmotor Corporation, has saved much time and effort in the identification and inspection of the many fittings required at various stages of assembly.

Formerly, when parts were received from supplies, they first had to be identified by Towmotor part number, then checked against blueprints kept on file for that purpose. Now all fittings are given a quick visual check to determine their compliance with specifications. By having all of the fittings in use mounted on one board, each identified with a small tab specifying name and part number, new parts can be quickly identified by comparison with the mounted fitting.

BUSES ASSEMBLED ON ROTATABLE JIGS



Borrowing a successful technique from aircraft manufacturers, the Kenworth Truck Company, Seattle, has instituted something new in the bus industry by using rotatable jigs in 4 major assemblies and 14 subassemblies. In addition, the company makes one plaster mock-up from which it designs all its jigs, as well as the dies for structural members and skin

LEWIS-SHEPARD FORK TRUCK

DEPENDABLE

POWER

EXIDE-IRONCLAD POWER
AND BATTERY ELECTRIC TRUCKS

Keep materials moving steadily, safely, at minimum cost . . . .

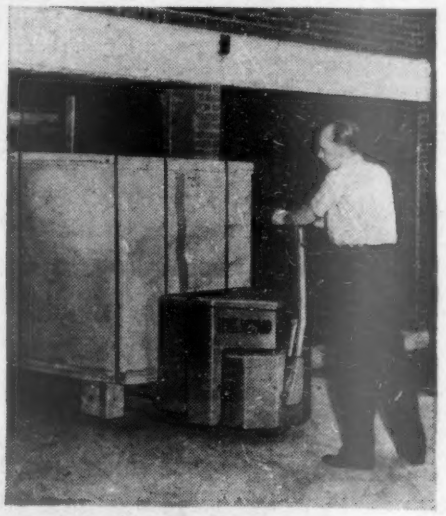
You can make substantial savings in materials handling costs by using the modern, efficient method employed by so many others throughout your industry. They have delegated their hauling, unloading, lifting, handling, placing and stacking to the time-and-cost-saving team of heavy duty electric trucks and Exide-Ironclad Batteries.

Exide-Ironclad Batteries have the high power ability, the high sustained voltage and the high capacity that exacting handling requires. You can always count on Exide-Ironclad Batteries for dependability, long life and ease of maintenance.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of materials handling problems. It tells how to cut handling costs up to 50%. It covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 20, Pa.
Exide Batteries of Canada Limited, Toronto

LEWIS-SHEPARD POWER JACKLIFT



management data sheet 11

STANDARD COSTS FUNDAMENTALS

1. Purpose of Standard Costs

a. Standard costs represent a tool of management used to plan for operating profits, to improve managerial control of operations, and to evaluate reasons for success or failure in achieving profits.

2. Fields of Application

a. Standard costs may be applied to any type of manufacturing enterprise.

3. Principles of Standard Costs

a. Standard costs of all products are developed on the basis of the normal level of activity.

b. All expenses within each productive and nonproductive department are analyzed to determine their relationship to volume of direct labor below, at, and above normal level.

c. Flexible budgets are developed for all departments, to provide fair standards of expense.

d. Operating statements are prepared to indicate the actual against budgeted performance.

e. Managerial control is exerted through concentrated attention on the variations between actual and budgeted performance.

4. Development of Normal Sales Budget

a. The basis of a standard costs program is a forecast of product sales, at a normal level.

b. In the development of the forecast, consider the potential capacity of the plant, as well as the sales level that represents the breakeven point with respect to profits.

c. Break the sales budget down into the various classes of product, indicating quantities and dollar volume for each class.

5. Development of Normal Direct Labor

a. On the basis of the normal sales budget, calculate the normal volume of direct labor for all operations, according to departments.

b. Direct labor should include all operations that change the character of the raw material, and add to the value of the product.

c. Classify direct labor according to logical manufacturing departments, using the existing manufacturing facilities as a guide.

6. Development of Operating Departments

a. The analysis of normal direct labor determines the structure of the manufacturing organization, with respect to operating departments and supervisory responsibilities.

b. Consider changes in physical facilities and the supervisory structure, to conform with the requirements of normal direct labor.

c. Then decide which departments are to be recognized for operating and cost purposes, as well as the specific foremen who are to assume responsibility for the departments.

7. Development of Chart of Accounts

a. Having determined the manufacturing structure, consider the chart of accounts.

b. All accounts form the basis of the balance sheet and the profit-and-loss statement.

c. The existing balance-sheet accounts, which include assets, liabilities, capital, and surplus, need not be changed.

d. The existing profit-and-loss accounts, which include revenues, expenses, costs, and income, must be considered.

e. Classify profit-and-loss accounts into three groups—production, distribution, administration.

f. Distribution accounts include all expenses and revenues relating to the marketing of the product; administration accounts include executive salaries and all expenses and income relating to the corporation itself.

g. Production accounts, with which standard costs are vitally concerned, include all expenses and costs that contribute to the manufacture and storage of the product until it leaves the plant. They may be classified into three groups—departmental expense, general factory expense, and standard cost accounts.

h. Departmental expense accounts include all labor, production, and maintenance expenses charged directly to a manufacturing department.

i. General factory expense accounts include all salaries and overhead expenses not chargeable to any single manufacturing department.

j. Standard cost accounts, the only new accounts necessary, include "standard production costs" and

Prepared by Bruno A. Moski, Jr., Production Superintendent, The American Paper Goods Company, Kensington, Conn.

CONTINUED ON PAGE 148

Sinks its Teeth into a 50% Saving

SUN GEAR LUBRICANT...

Clings to Gear Teeth, Lasts Longer, Helps to Cut Lubrication Costs

A well-known New England mill had a chronic maintenance problem in the lubrication of a big gear train. Messy, black gear compounds were being used. They were hard to apply and didn't stay on.

To correct this situation a Sun Engineer was called. After checking all the factors involved, he recommended an extra heavy Sun grease with special adhesive properties.

A saving of 50% in lubrication costs has been effected since the Sun grease was adopted. The Sun product lasts longer, adheres to the gears and does not dirty up the mill.

"Job Proved" Sun lubricants are making records like this in scores of mills and factories in many parts of the country. They are helping to cut operating costs, to end maintenance headaches, and to keep machines in first-class condition. For full information and practical advice on lubrication, call your nearest Sun Engineer. Or write Department F-7.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

SUN

SUNOCO

INDUSTRIAL PRODUCTS

management data sheet 12

STANDARD COSTS · FUNDAMENTALS

CONTINUED FROM PAGE 146

"variations from standard costs" of material, labor, overhead, and inventory.

8. Development of Flexible Budget

a. The next step is the development of standard departmental overhead percentages and a flexible budget.

b. The standard departmental overhead percentages include all departmental expense accounts and general factory expense accounts, with each account considered separately so that it may be allocated to the various departments.

c. Standard departmental overhead percentages include, for each account, expenses considered proper at the normal level of direct labor, with the total expenses related to the corresponding volume of direct labor as a percentage.

d. The flexible budget includes only costs that are controllable by the foremen.

e. Each account is carefully analyzed for each department, to establish the standard expense at the normal level of direct labor, as well as the standard expense at various other levels, ranging from 50 to 150 per cent of the normal level.

9. Development of Standard Cost Cards

a. Steps are next taken to prepare a standard cost card for each separate item of product.

b. The standard cost card lists all required direct labor operations in the proper sequence, together with the departments in which they occur.

c. The total standard direct labor in each department is multiplied by the standard departmental overhead percentage to determine the standard overhead cost.

d. The standard amount of raw material needed for each item is indicated, extended by a purchase price established as standard.

e. The total standard material cost, standard direct labor cost, and standard overhead cost represent the standard factory cost for each item.

f. Establish percentages for shrinkage, and distribution and administration expenses, and add them to the standard factory cost to determine the total standard cost.

g. A percentage of profit margin should be established, and added to total standard cost, to determine the standard selling price.

10. Operation for Initial Date

a. Extensive preparations are necessary in advance of the date selected to change the existing cost system to the standard cost system.

b. All factory and accounting records must be changed to conform to the information on the standard cost cards. Preparations must be made to take a physical inventory and journal entries must be planned to adjust existing inventory valuations.

c. Provisions must be made to establish procedures for the evaluation of variations in raw material purchase price, material consumption, direct labor, departmental expenses, and absorption of overhead.

11. Operation of Standard Cost Plan

a. Successful operation of a standard cost plan depends upon the accuracy with which operating records are prepared and maintained.

b. Perhaps the most important set of records is a complete production report by each manufacturing department, together with the proper allocation of actual hours and payroll to the accounts provided.

c. On the basis of the weekly production reports and payroll distribution, a statement is prepared to indicate the success or failure of each foreman in maintaining his payroll expenses at the proper level with respect to the current volume of direct labor.

12. Closing the Accounting Period

a. The important task at the completion of any accounting period is the preparation of a profit-and-loss statement.

b. Under a standard costs plan, the profit-and-loss statement, together with the associated supporting statements, is presented so as to facilitate management consideration for corrective action.

c. The basic operating statements of all manufacturing departments emphasize the success or failure of each foreman to meet his budget.

d. The profit-and-loss statement summarizes in its variation from standard costs the reasons why the profit was greater or less than planned.

e. A sales analysis statement is usually prepared to indicate, by product classes, the gross and net profit-or-loss margins incurred, to serve as a managerial guide for changing the sales program.

Prepared by Bruno A. Moski, Jr., Production Superintendent, The American Paper Goods Company, Kensington, Conn.

AN EXAMPLE:

This is a diesel engine exhaust manifold outlet fabricated with Tube-Turn welding fittings taken out of regular stock. Replacing castings—eight such outlets to an engine save .71 lbs. per horsepower. Seems little, but multiply this by 1000 and you have 710 pounds of dead weight eliminated.

"It can be done!"

SO MANY piping problems are solved with the use of welding fittings that it pays to see your Tube-Turn Distributor first. He handles *the fitting that becomes part of the pipe.*

Tube-Turn welding fittings—engineered in design, built with closer tolerances than code requirements, available in a wide variety of styles, sizes and materials—often offer just the right answer to what sometimes seems an impossible problem. Welding fittings for example, permit extremely close nesting without flow loss. Tube-Turn welding fittings have uniform wall thickness and full circularity which allows them being cut and used at odd angles. Order one, one-hundred, or a thousand Tube-Turn welding fittings of the same size and part number and they will be dimensionally uniform. They can be and are being used in production line assembly of equipment.

For full information about the more than 4000 types and sizes in the complete line of Tube-Turn welding fittings and flanges—for details about the wide range of special metals and alloys—for the name of your nearest distributor, write to—

TUBE TURNS, INC., LOUISVILLE 1, KENTUCKY
District Offices at New York, Washington, D. C., Philadelphia, Pittsburgh, Detroit, Chicago, Houston, San Francisco, Los Angeles.

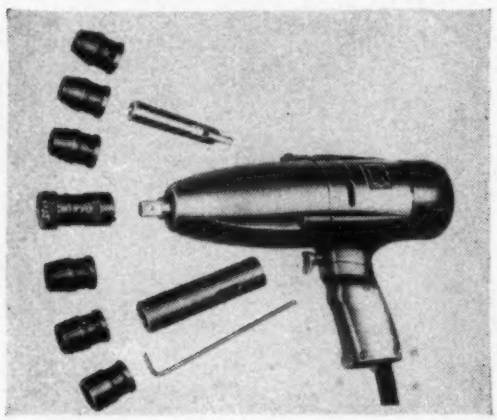
TUBE-TURN TRADE MARK *Welding Fittings and Flanges*

WHAT'S NEW IN EQUIPMENT

Briefed here—for the convenience of plant operating men—are descriptions of industrial plant equipment newly placed on the market

ELECTRIC IMPACT TOOL

Universal electric all-purpose impact tool, using standard attachments, is designed to apply and remove nuts; drill; ream; tap; drive and remove screws; drive and remove studs; extract broken capscrews and studs; run wire brushes; do hole saw work; drill brick and masonry; and drive wood bits. Designated Size 4U, tool weighs 6½ pounds, has an over-all length of 10½ inches, a free speed of 2000 r.p.m. It is powered with a reversible, universal electric motor (3 amp.) operating on 110-volt,



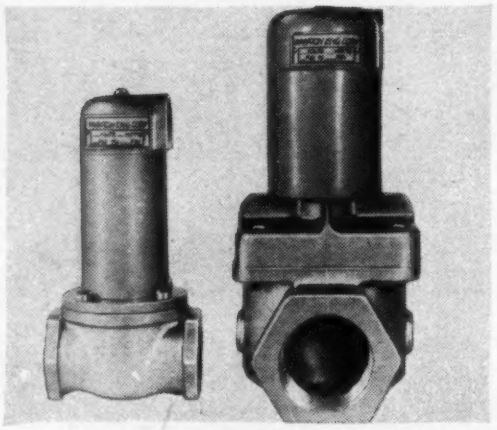
a.c. or d.c. circuit. When the resistance to spindle rotation reaches a certain value, a patented mechanism converts the power of the motor into "rotary impacts" (1900 per minute) which exert a powerful turning effect. The impact assembly permits the spindle to be stalled completely while the motor continues to run, thereby eliminating motor burnouts caused by over-loading. Also eliminates torque reaction to the operator. There is no kick or twist under any condition, manufacturer states. Standard accessories include six hexagon sockets, 7/16 to ¾ in.; a collet-type chuck; Morse taper socket; Morse taper adapter sleeve; and Allen wrench. They are rated to handle nuts and cap screws up to ⅜-in. thread size, ¼-in. drilling in metal and up to ½ inch by step drilling; reamers up to ½-in. diameters; taps from ¼ to ½ inch; machine screws up to ⅜-in. thread size; studs up to ⅜-in. thread size; for woodworking, up to ⅜-in. twist drills with collet-type chuck, and up to 29/32-inch with Morse taper; and carbide-tipped masonry drills up to ⅜-in. diameter. Ingersoll-Rand Co., 11 Broadway, New York 4.

WOOD FLOOR SEAL

Liquid seal for protecting wood floors from dirt, grime, and wear, is marketed under the name of Nu-Vex. It is said to be a well-bonded, low-viscosity liquid which penetrates deep into the wood to seal pores and cells and to form an oil- and water-resistant surface that strengthens the wood fibers exposed to grime, abrasion, and traffic, and eliminates germ nests which might spread respiratory diseases. It is clear, odorless, and transparent, and, according to the manufacturer, will not darken or stain the wood, nor chip, crack, or peel. Restoring the original appearance of old floors, it provides the foundation for a permanent glossy finish when the floor is waxed and polished. Designed for corridors, warehouses, and other wood floors subject to heavy loads of traffic, it is applied with either brush or lamb's wool applicator. Turco Products, Inc., 6135 South Central Ave., Los Angeles 1.

SOLENOID VALVES

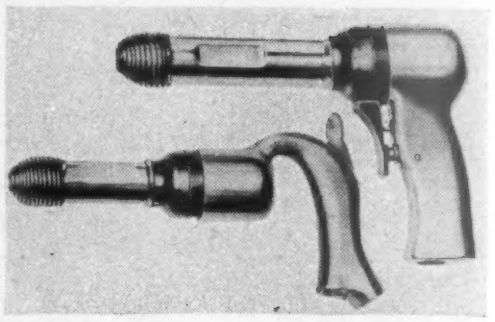
Suitable for gas, oil, air, and water, solenoid valve is designed for maximum safety with current failure shutoff; and high and low pressure operation—200-lb. rating in sizes up to ¾ inches, 15-lb. rating in sizes up to ¾ inch, 15-lb. compound forms the port gate. A metal



stiffener is inserted in the gate. Full line pressure in both open and closed position permits the stainless steel seat to be closed at pressure as low as ½ inch of water. Valve guide, seat ring gasket pilot valve cage, and coil retaining screws, washers, and springs are eliminated. Valve bonnet and plunger tube are cast in one piece. Heavy-duty solenoid coils are interchangeable for 115 or 230-volt, 60- and 50-cycle operation. Wheelco Instruments Co., 847 West Harrison St., Chicago 7.

PNEUMATIC TOOLS

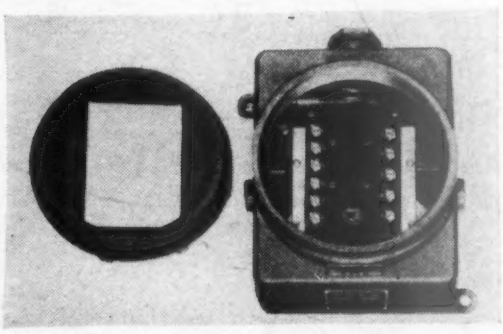
Line of 28 models of pneumatic tools includes hammers, drills, screwdrivers, nut runners, and die grinders. The grinders are made in three types, for die grinding, burring, rotary filing, and for use with wire size drills. Dimensions for the three models are 7x1½ inches; they



weigh slightly over 1 pound; speed is 24,000 r.p.m. The pneumatic hammers are provided in three sizes with four models in each size. They are adaptable for riveting, light chipping, beading, calking, gouging, and star drilling. Made with offset or grip handles, and Parker taper or hexagon nozzles. Tapered clearance in throttle valve seat is said to provide accurate air metering for controlled blows. Skilsaw, Inc., 5033 Elston Ave., Chicago 30.

LEVEL CONTROL

Type 10CBIX a.c. level control combines a probe circuit and transformer to operate a d.c. relay. Contact with the liquid is made only by stainless steel probe rods. No vacuum tubes are used. Accuracy is independent of temperature and pressure. The control may be supplied in an explosion-proof housing, or in a pressed steel dust-tight enclosure. Specifications—supply, 115 or 230 volts,



25/60 cycles a.c.; output, 2 amperes at 115 volts, 1 ampere at 220 volts. Photoswitch Inc., 77 Broadway, Cambridge 42, Mass.

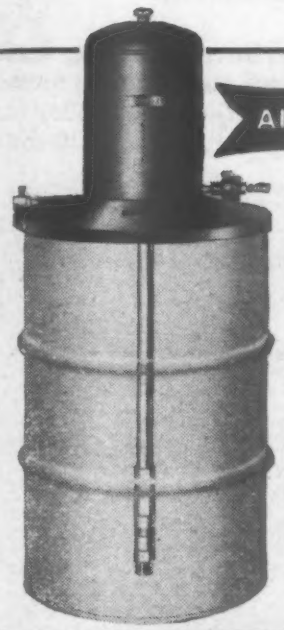
INTERCOMMUNICATORS

Line of "selector" intercommunication system features five models of master and remote stations. The system may be hooked up in any combination, with the number of stations in the "line" limited only by the number of selector keys on master station. Two models of the master station have six selector keys, two have twelve keys, and the fifth station is a remote type, through which

ALEMITE power lubricating equipment packs a real "wallop"!

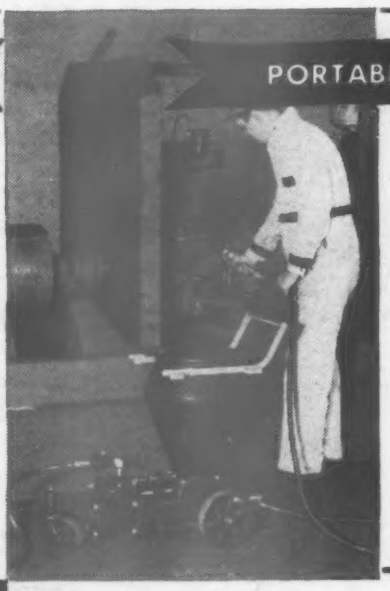
SAVES TIME AND MONEY... CUTS LUBRICATION COSTS

"Weak-kneed" lubrication won't protect your vital machinery from wear and breakdown. In every factory wherever there are vital moving parts, ALEMITE POWER EQUIPMENT is saving money by reducing "down-time" for lubrication.



AIR OPERATED BARREL PUMPS

These pumps are available in both high pressure and low pressure types. They handle fibrous, heavy and light-bodied greases, even at low temperatures, and operate off original 400 lb. drums. Ideal for industrial plants and for truck fleets requiring the best in heavy duty lubricant pumps. Powerful enough to serve single or multiple outlets with equal efficiency.



PORTABLE AIR POWER GUN

This pump packs plenty of "oomph." It's ideal where heavy duty requirements and extensive lubrication needs make manual methods impractical. It handles a volume delivery of heavy fibrous lubricants at low temperatures. A worm-feed assures positive volume delivery at high pressure. Its large wheels make the unit easy to move around.

PORTABLE ELECTRIC POWER GUN

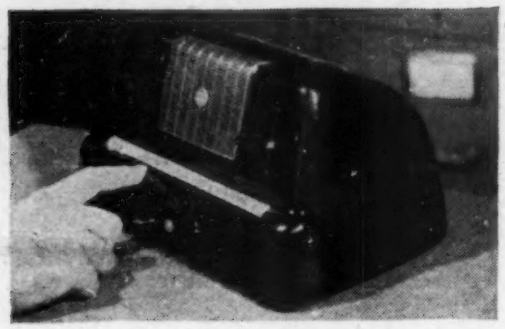
No plant in any industry is too large or too small to enjoy the benefits of this power gun. Model 7180 is a 25-lb. capacity gun with a heavy-duty ⅓ h.p. electric motor. Develops 5000 pounds grease pressure. Delivers approximately 9 oz. per minute. Just plug in and this gun delivers fast, positive high pressure lubrication with all types of lubricants that seek their own level.

ALEMITE

First in Modern Lubrication

INDUSTRIAL LUBRICATION EQUIPMENT

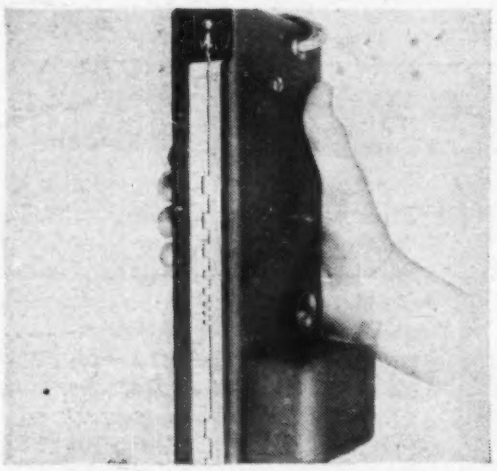
Alemite, 1870 Diversey Parkway
Chicago 14, Illinois



calls can be initiated and received from the master station to which it is connected. Combination on-off and volume-control switch lights a pilot lamp to signal that the unit is ready to send or receive. Sound Equipment Section, Radio Corp. of America, RCA Victor Div., Camden, N. J.

TIME AND OPERATION RECORDER

Known as Time-O-Log, time and operation recorder utilizes a synchronous motor to motivate a wide strip chart ¾ inch wide at a speed of either 2 or 4 inches per hour. A 5-watt electrical current moves the pen when contact is closed. Makes a visible permanent record of the number and frequency of operations on machinery, control instruments, and other equipment. The strip chart is divided into a 12-hour cycle,



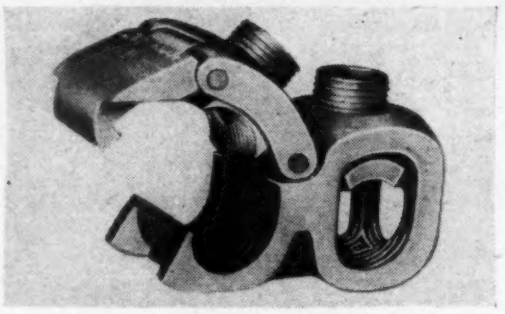
and provides interval markings of 5 and 15 minutes. The recorder may be mounted in a universal type controller or on a table or wall separately, and used as auxiliary equipment to other types of temperature or process control instruments. Although built for 110- or 220-volt a.c., 60-cycle operation, models may be furnished for 25- and 50-cycle operation. Wheelco Instruments Co., 847 West Harrison St., Chicago 7.

ALUMINUM CONVEYOR

All components, such as chain, belt, sprockets, channels, angles, frame, and other parts of prefabricated belt conveyor are constructed of heat-treated aluminum alloy. Called the Mercury, it is rust and corrosion-resistant. Available in widths from 6 to 60 inches, heights from 15 inches up, standard height is 36 inches. Conveyor is shipped in 5-ft. sections, which may be assembled in one continuous unit up to 150 feet in a few minutes. Any speed up to 100 f.p.m. may be obtained, and load capacity is 250 p.s.i. Belt is supported by phenolic rollers, 8 to each foot. Standard equipment includes speed reducer, drive, pillow blocks, take-ups, shafts, and electric reversible control. Patron Transmission Co., 129 Grand St., Dept. 61, New York 13.

HINGED WIRE CONNECTOR

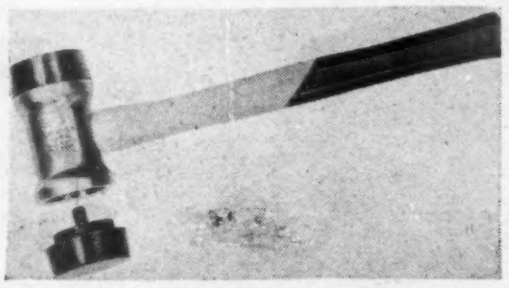
Available in 25 sizes, accommodating over 400 wire combinations ranging from No. 8 to 1,000,000 cm., line of XTP con-



nectors is said to do practically all tap jobs. It is of one-piece hinged construction, and can be permanently attached to the main and left for the tap to be attached later. One end of the connector is snapped over the main and tightened, the other has serrated openings to which a tap can be run in any of three directions. Features include spring steel lock washers (tinplated) maintaining permanent pressure, grip holding serrations on wire-contact surface for maximum pull-out strength, non-rotating pressure plates, highly conductive copper alloy body, and extra strength copper alloy hinge and pressure plates. O. Z. Electrical Mfg. Co., 262 Bond St., Brooklyn, N. Y.

PLASTIC-TIP HAMMERS

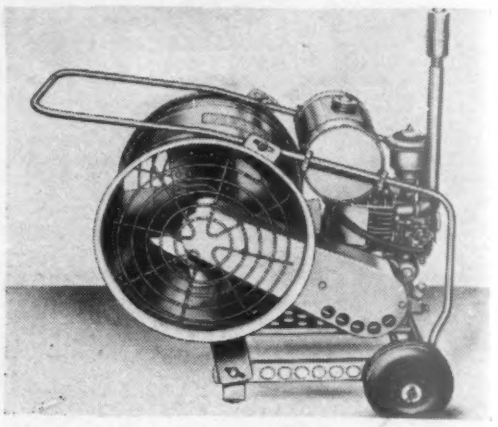
Ten hammers with hard plastic tips, and two with extra-soft tips are announced. The plastic tips, made of Nuplaflex, are claimed to recover original shape when bent, dented, or cut; to resist chipping, cracking, or flaking under hard blows; to be non-explosive and non-sparking; oil- and grease-resistant; to absorb



vibration; and to minimize rebound. Tips of the same size are interchangeable, permitting use of a hard as well as soft tip on one hammer. They are automatically locked when screwed on a head. The hickory handles are octagonal in shape. Plomb Tool Co., 2209A Santa Fe Ave., Los Angeles 54.

PORTABLE VENTILATOR

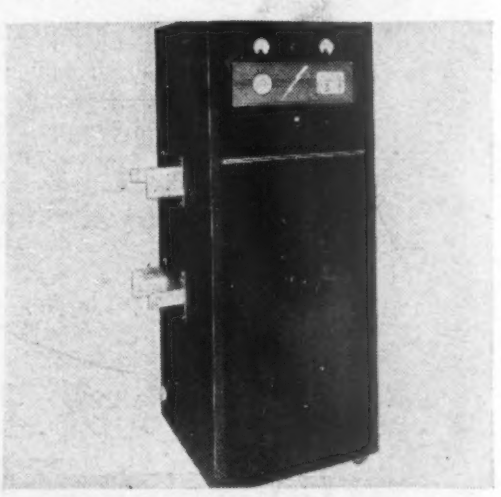
High-capacity, lightweight, portable ventilator consists of a fan powered by either a gasoline engine or an electric motor, mounted on a metal frame



equipped with two rubber-tired wheels. Equipment includes one extensible canvas duct, 14 inches in diameter and 16 feet long, for conveying air to desired area. Two-way air flow permits drawing smoke, dust, or gases from the area, as well as supplying fresh, cooling air. Duct is treated for flame and moisture resistance. When not in use it can be collapsed and fastened with a carrying strap. Maximum air delivery without duct is claimed to be 4500 c.f.m., and with duct, 4000 c.f.m. The Herman Nelson Corp., Moline, Ill.

SELENIUM RECTIFIER

Self-contained rectifier, including basic rectifier, motors and shunt, incorporates tap switches for 6, 9, and 12 volts, for 500- and 1000-amp. capacity; 6 and 9 volts

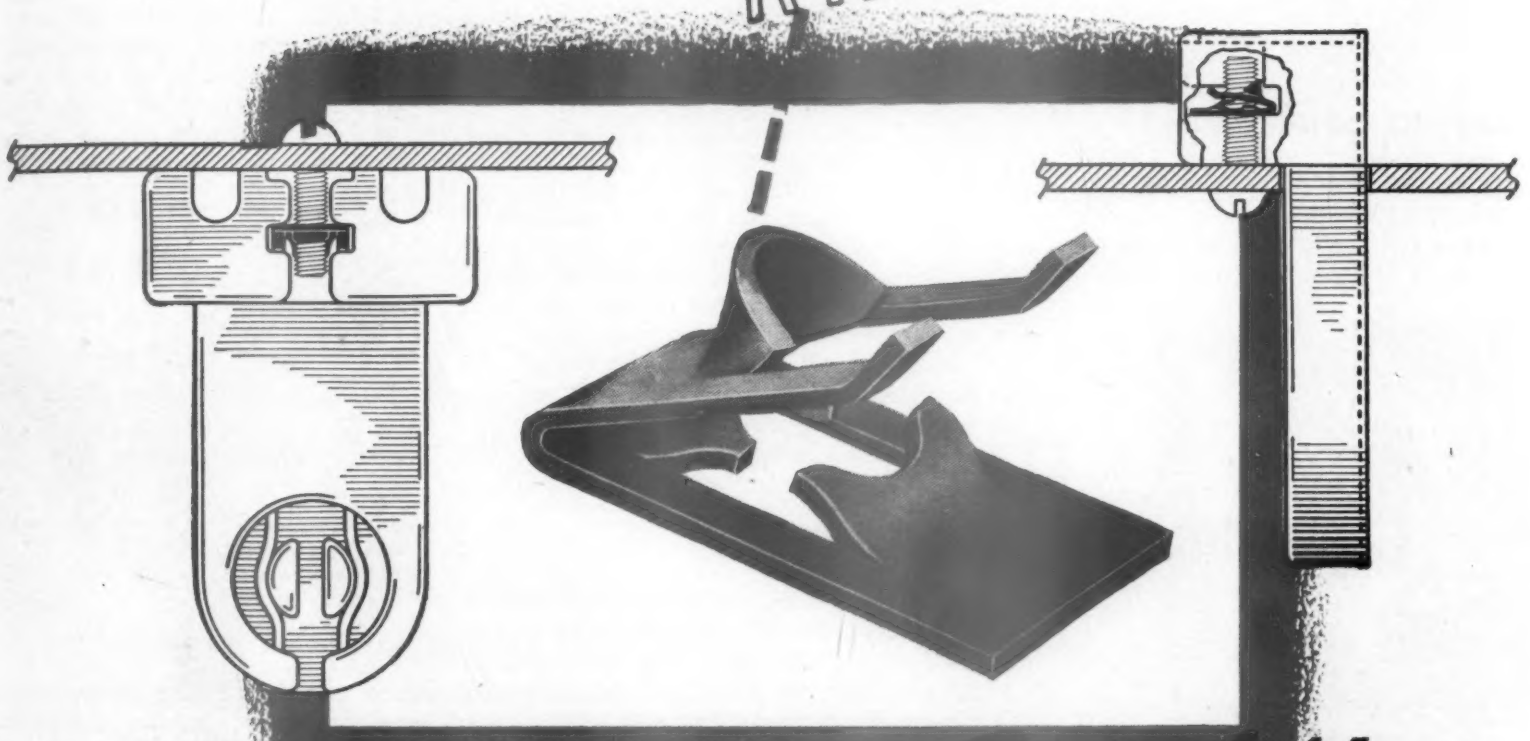


for 1500 amp.; and combination 6/12 and 9/18 volts up to 1000/500-amp. capacity. Separate remote controls employ tap switches from 12 volts-500 amp. to 6 volts-5000 amp. A 3-gang switch makes voltage adjustments. Voltage taps are in approximately 1-volt steps. The d.c. output circuit is not broken with the tap switch controls, maker states. Richardson-Allen Corp., 17 West 20th St., New York 11.

VARIABLE CAPACITOR

Air-dielectric variable capacitor has a range of 30-1 between minimum and maximum capacitance. Suitable for in-

This is a ★ *Speed Nut*



THIS is also a *Speed Nut*

● Here is a self-retaining, self-locating and self-locking SPEED NUT designed for fluorescent tube lamp sockets. But it's merely one of hundreds of special shapes that do more than merely hold the screw.

This SPEED NUT C6800 is zipped into the recess in the lamp socket to stay. The turned up ends of the spring arms "bite" into the plastic to lock the SPEED NUT firmly in place. It is self-locating because the extruded collar butts up against the back of the vertical slot to line up the SPEED NUT impression with the screw hole. It's self-retaining and self-locking because of the exclusive spring tension lock of the SPEED NUT Brand of fasteners. Fits any socket of this type using standard 6-32 machine screws.

Why not let us design a fastener for you that can be applied twice as fast and do a lot of other things besides holding the screw. Write for samples or send your engineering details for a no-charge analysis.

TINNERMAN PRODUCTS, INC.
2096 FULTON ROAD, CLEVELAND 13, OHIO
In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
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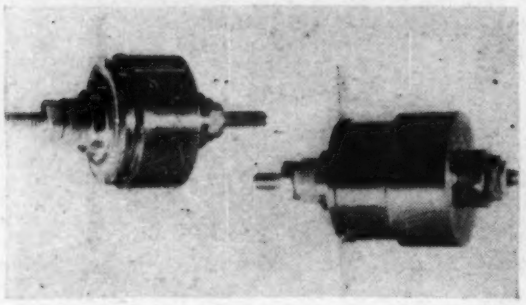
MORE THAN 4000 SHAPES AND SIZES

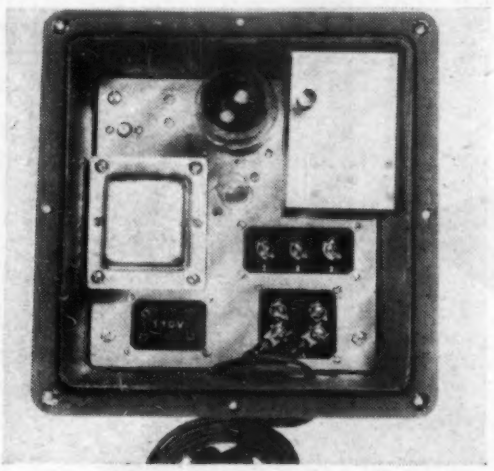
FASTEST THING IN FASTENINGS



dustrial electronic applications, it is virtually impervious to mechanical shock, according to the manufacturer. Has a flash rating of 500 volts, and the capacitance is adjustable from 5 to 150 mmf by rotation through 5000 degrees. The capacitance curve is substantially linear with rotation, and no reversals are said to occur throughout the range. Maximum outside diameter is ⅞ inch, and over-all length is 1¾ inch. North American Philips Co., Inc., 100 East 42nd St., New York 17.

ELECTRONIC CONTROL UNIT

Packaged control unit, called Electrolink, contains an electronic tube, relay transformer, pilot light, and terminal panel, mounted in a 7⅝x8⅛x5⅝-in. dust-



proof housing. Pick-up units designed for the particular process may be applied to control rate of flow meters, counters, scales, alarm systems, automatic machinery, machine tools, and other equipment where motion is involved. The control operates on 10 amperes at 110 volts, 5 amperes at 220 volts, instantly sensing movements as small as 0.0005 inch, providing positive control action, according to the manufacturer. Wheelco Instruments Co., 847 West Harrison St., Chicago 7.

ABRASIVE STICKS

Made of abrasive grains bonded in rubber, flexible abrasive sticks are tough, pliable, long-wearing, do not load or glaze, and may be used dry or with water, it is stated. They are available in 3-, 6-, and 8-in. lengths, and are made in three grains—fine, medium, and coarse. Standard shapes include rectangular, square, triangular, and round, and the sticks can be cut and shaped to suit the job. Sizes range from ¼-in. diameter round shape to 8x1x½ inches in the rectangular sticks. Blocks 4x4x¾ inches are also obtainable. Sandusky Abrasive Wheel Co., 743 West Ransom St., Kalamazoo, Mich.

CEILING BOARD

Acoustical board, for use with recessed-type fluorescent light troffers, forms a suspended sound-absorbing ceiling. The board is laid between continuous troffer rows, and may be used in new construction or in remodeling. Composed of

processed glass fibers treated with a thermosetting resin, the board is made in sizes 25½x48 inches and 24x48 inches, with thickness of 1 inch. The board is beveled and cross-grooved to simulate tile, and is painted white, to provide high light reflection. It is said to be non-combustible, and to span 24 inches without sag or cross support. Owens-Corning Fiberglas Corp., Toledo 1.

CO_2 REGULATOR

Internal nozzle mechanism in Model C10 pressure regulator, for carbon dioxide gas, automatically removes any dry ice formation from the seat. Inlet is also designed to avoid formation and retention of any dry ice. Victor Equipment Co., 844 Folsom St., San Francisco 7.

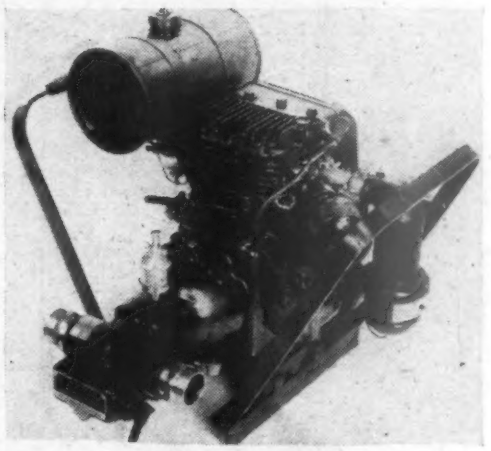
FIRE AND COLD ALARM

Called DetectoMaster, a compact, wall-mounted control unit warns against sudden heat or cold. Equipment includes "detector" thermostats which are placed in as many areas as require protection. When any one of the thermostats detects an abnormal temperature, it actuates a Klaxonette horn which sounds an im-

mediate warning, and indicator needle on meter points out the endangered area. The unit also warns against sudden excessive cold that may mean frozen water pipes, or if the cold-making mechanism in a refrigerating plant fails. The master thermostats are preset for 20 to 200 deg. F. Special temperature settings are available. As many as 300 thermostats may be used with the central control. Lord-Taber Co., Inc., Canandaigua, N. Y.

HIGH-PRESSURE PUMP

Duraflex 660, portable high-pressure pump features rubber impellers. The self-contained power source is a single-cylinder, 4-cycle air-cooled engine, delivering 5 horsepower. The pump is mounted directly to the engine, and power is transmitted through a splined sleeve. Engine has its own crankcase oil supply. Pump bearings are automatically lubricated by a spring loaded grease cup. The pump delivers over 40 g.p.m. at 120 p.s.i., and has a suction lift of over 30 feet. An automatic bypass valve relieves



pressure in excess of 150 p.s.i. The rotors, a development of rubber synthetics, pump solids and abrasives. Any water source is used. A pulley-equipped model may be obtained for external belt-driven power applications. Marine Products Co., 515 Lycaste Ave., Detroit 14.

STEEL-BELT CONVEYORS

Conveyors employing troughed belts of carbon or stainless steel are now on the market. Either pre-troughed or self-troughing belts may be supplied. The pre-troughed type is suitable for handling light, easy-flowing material, while heavy materials such as coal have sufficient weight to depress the self-troughing belt into its intended form. The entire unit, including belt, idlers, motor, and supporting structure, is supplied disassembled, with instructions for installation. Sandvik Steel, Inc., 111 Eighth Ave., New York 11.

WORK GLOVE

Calleo Super Canton, work glove is treated with a protective coating designed to withstand hard use, and to lengthen life of the glove. Soft and

WILL THE SAME CONVEYOR BELTING HANDLE BARLEY, BRICK AND BRIMSTONE?

YOUR THERMOID DISTRIBUTOR* WILL KNOW

The price you pay for conveyor belting should be based on the service conditions it must meet. To get the belting that's just right for your work, consult your Thermoid distributor. Tell him what is to be moved and he will be able to specify the most economical belting for the job.

He can also tell you—

That Thermoid conveyor and elevator belting is carefully built for the service each is recommended and sold for. He will be able to tell you that impressive records of trouble-free operation have been made by Thermoid beltings largely because each type is designed and made with a thorough understanding of the wear factors in the service specified.

He knows something about Thermoid too—

Thermoid concentrates its manufacturing for industry on the well integrated line as shown below. The Company itself, while large enough to be thoroughly reliable, is still small enough to keep active contact with customers and their problems. That's one of the reasons why—

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID!

THE THERMOID LINE INCLUDES: INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • TRANSMISSION BELTING • F.H.P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE.

Thermoid Products

AUTOMOTIVE • INDUSTRIAL
OIL FIELD • TEXTILE

THERMOID COMPANY, TRENTON, N. J., U. S. A.

*

A postcard or a letter to the factory will bring his name and address to you.

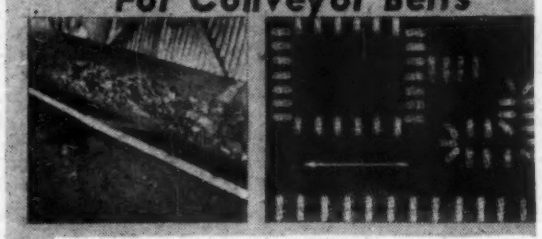
Manufacturers of new equipment are invited to correspond direct with the home office.

Thermoid
INDUSTRIAL RUBBER PRODUCTS
BUILT FOR THE JOB
QUALITY · VALUE · SERVICE

Present Day Practice in Belt Fastening

Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization.

For Conveyor Belts



FLEXCO HD Belt Fasteners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips that can be repaired with these fasteners and Flexco HD Rip Plates.

Bulletin F-100 gives complete details on how to fasten and repair conveyor belts.

For V-Belts

ALLIGATOR V-Belt Fasteners are now being widely used to fasten B, C and D, open-end V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for **Bulletin V-14.**

For Transmission Belts

ALLIGATOR Steel Belt Lacing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to ⅝" thick and as wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts.

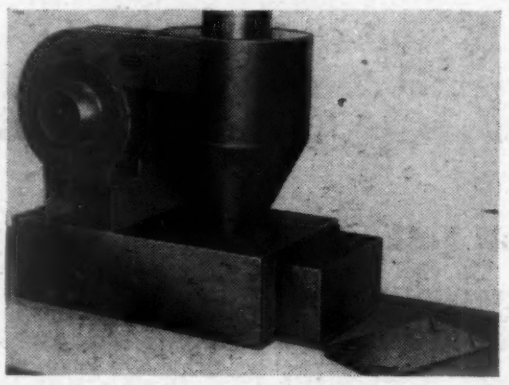
Sold by Supply Houses Everywhere

FLEXIBLE STEEL LACING COMPANY
4678 Lexington Street, Chicago 44, Ill.

flexible, it has a non-slip, water-repellent surface. The wingtype thumb eliminates seams at bottom which might give way. Riegel Textile Corp., 342 Madison Ave., New York 17.

DUST COLLECTOR

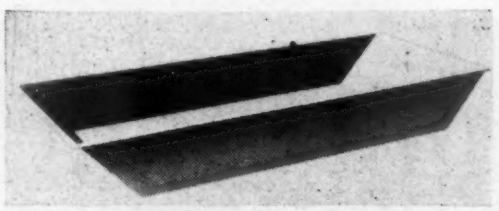
Designed to collect dust, lint, and dirt from heavy-duty polishing, grinding, and buffing work, Model 11N50 Dustkop permits outside exhaust of the cleaned air. The cyclone separator is provided with a stack connecting sleeve so that



piping can be installed for the purpose. Powered by a 1½-hp. continuous-duty motor, direct driving paddle wheel, self-cleaning fan, the unit develops in excess of 1500 c.f.m. at 3.2 inches static suction on a 6½-in. diameter inlet. Dust is removed by means of dust drawer in base of collector. Aget-Detroit Co., Main at Washington St., Ann Arbor, Mich.

STEEL MORTAR BOX

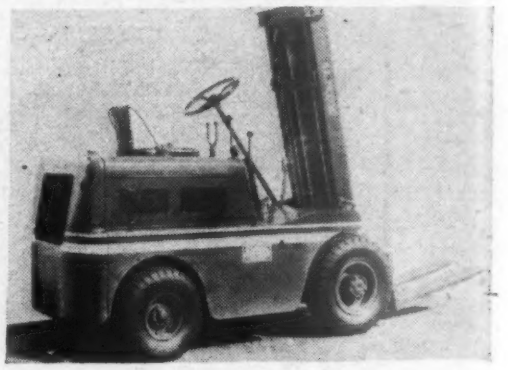
Made of 14-gage hot-rolled steel, mortar box has all-welded seams and reinforced flanges. It is said to be water-tight, light, easy to keep clean and to handle, dur-



able, and long-lasting. In cold weather, fire can be used with the box to keep the mortar from freezing. Available in four sizes. Bostwick Steel Lath Co., Niles, Ohio.

FORK TRUCK

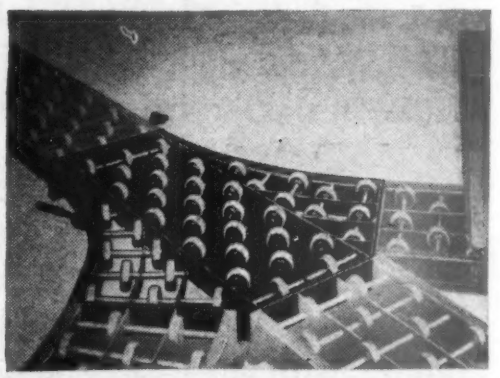
"Yardlift-40" is the name of a pneumatic-tired fork lift truck built for working outdoors and on uneven surfaces. Has a capacity of 4000 pounds at 24 inches, and a lift of 120 inches with 85½-in. over-all height. Standard Carloader forks and attachments can be used. Equipped with center-pivoted steering axle, heavy-duty transmission providing speed of 9.4 m.p.h. in high and 2.9 m.p.h. in low, both forward and reverse, a mechanical governor, and engine includes a water pump and thermostatic control. Universal joint be-



tween transmission and drive axle simplifies clutch removal, and tire is changed by removal of demountable rim. Clark Tructractor, Div., Clark Equipment Co., Battle Creek, Mich.

CONVEYOR SWITCH

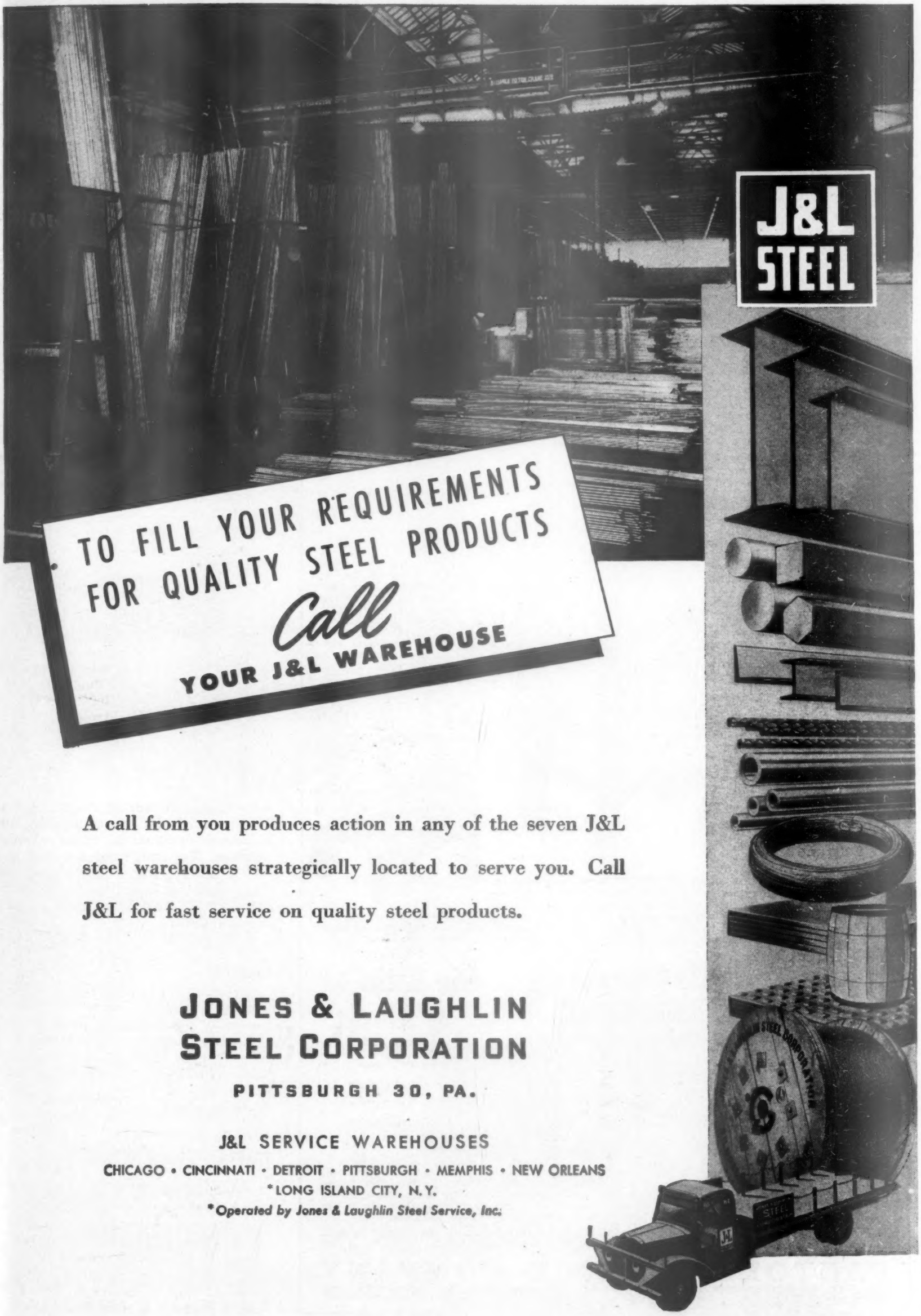
Switch for Roll-or-Wheel conveyors can be adjusted to provide flow in any one of three directions—left, right, and straight ahead—without moving the conveyor. A hand lever changes direction of flow. Pivot wheels in center portion of switch are integrated by levers controlled at a single point. The hand lever



can be extended for remote control when desired. Wheels in center section are raised slightly above the level of the wheels in the spin portion of the unit to eliminate any drag in the switching operation. Packages are conveyed in the selected direction without manual guidance. Rustproof "Red Wheels" are used. E. W. Buschman Co., Inc., Clifton & B. & O. R.R., Cincinnati 32.

HAND LOTION DISPENSER

Employees receive a measured amount of protective or germicidal hand lotion from wall-type dispenser, which elimi-



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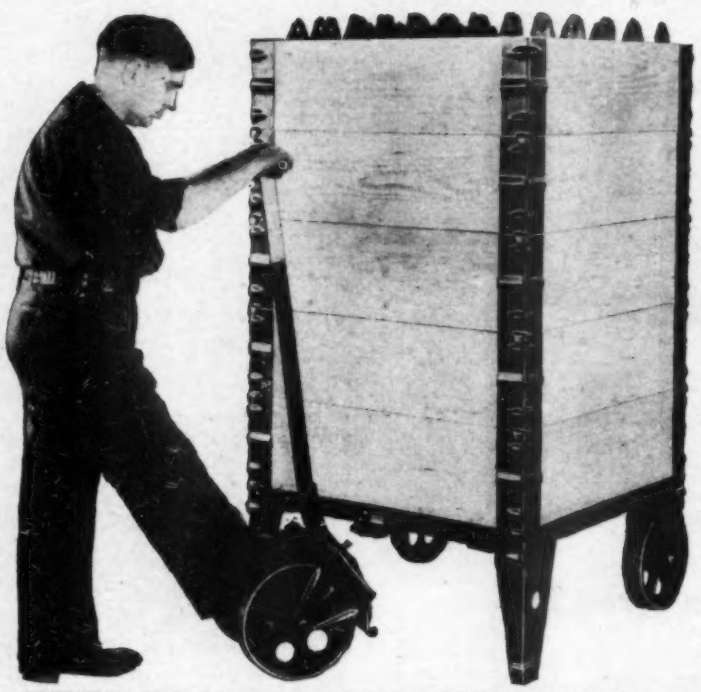
Turner Bin Sections on Movable Transports keep all materials in order.

Good Housekeeping is AUTOMATIC

when Your Plant Enjoys the Benefits of

THE TURNER SYSTEM

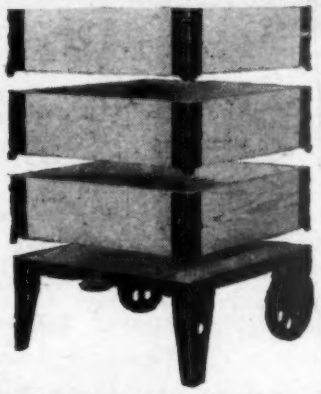
OF MATERIALS HANDLING



EVERY UNIT

- Standardized
- Interchangeable
- Movable

The Turner System puts everything on wheels for instant movement to any part of the shop . . . standardizes every Box, Bin, Shelf and Rack for to-the-ceiling stacking . . . provides quick accessibility, maximum stability — saves up to 50% in SPACE, TIME and LABOR for many companies.



"DELIVER THE BIN AND SAVE THE HANDLING" cuts costs in a big way. The Transport is half truck, half platform. It has the advantages of both. Fitted with Bin Sections (Wooden-side or All-steel), Racks, Trays and Die Tables, it is moved by hand Jimmy, power lift truck, crane or tractor. Bins are always the RIGHT SIZE because Sections are removed as load diminishes, added as load increases. No "diving" or stooping into wrong-size bins.

Die Racks on Wheels Save You Time, Labor and Space

You move dies without waiting for lift trucks when you have Turner System Die Racks mounted on Transports. Perfectly designed for better handling, protection and storage of dies, these Die Racks are moved quickly by hand Jimmy.

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nates waste. Unit is claimed not to leak, clog, or drip. All working parts are made of stainless steel. Bobrick Mfg. Corp., 1839 Blake Ave., Los Angeles 26.

BOILER FEED-WATER CONTROLLER

Claimed to embody powerful and positive magnetic action, instrument named Micro-Netic controls boiler feed-water. It weighs 7½ pounds, and can be attached to a boiler to occupy a space of 3½x7½ inches for its housing, and with

a switchbox measuring 2x4x6½ inches. The control includes a round ball float of monel designed to resist 400-p.s.i. pressure. The float carries a steel ring which attracts the magnets when the ring comes into their fields. J. A. Campbell Co., 645 East Wardlow Rd., Long Beach 7, Calif.

LAMPS

Line of fluorescent lamps now includes 6-watt T6 and 8-watt T6 lamps in 3500-deg. white. Addition of a 375-watt R-40 reflector type industrial heat lamp with a mechanical screw base to line of infrared lamps is also announced. Champion Lamp Works, Lynn, Mass.

RUBBER-TIRED WHEELS

Ranging in size from 4- to 14-in. extreme diameter, and from 1.75- to 3-in. diameter tire section, line of puncture-proof "Zero Pressure" rubber-tired wheels is available with sealed ball bearings, plain bronze, or oil-impregnated sintered bronze bearings. Maximum standard bore is ⅝ inch. The sealed and

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SMART BUSINESSMEN get double value on a single investment when they install the Automatic Printing Calculator in their office. This machine performs *all* the functions of both adding machine and ordinary calculator—figure production is speeded by the compact 10-key keyboard, and positive proof of accuracy is provided by the printed tape. Costs? Estimates? Payrolls? Inventories? Whatever the job, this complete *all purpose* figuring machine will handle it more quickly, more competently. Rely on the Automatic Printing Calculator to bring your office figure work to top efficiency.

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TYPE "H"
MULTIPLE BATTERY
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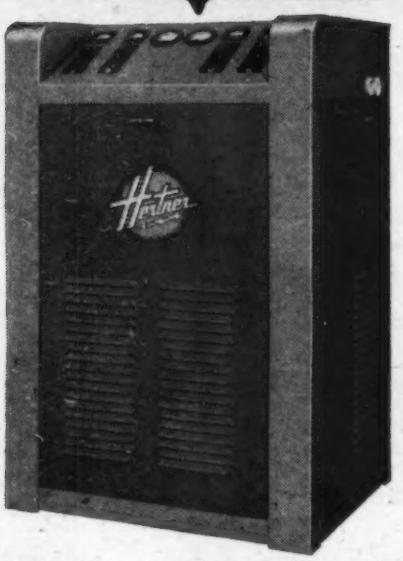

FULLY AUTOMATIC!

The Hertner Type "H" Motor-Generator Charger charges two or more batteries by completely automatic controls without removing the batteries from trucks.

Fully Charge Lead-Acid Batteries in 8 Hours—
Nickel-Alkaline Batteries in 7 Hours

Two and four circuit Type "H" chargers are self-contained units with motor-generator sets mounted inside control cabinet. Individual ammeters record charging rate of individual circuits.

Desk top height of instrument panel makes readings of charging rates available at a glance. Screened covers at sides and back provide air circulation for cool operation. Each charger is provided with charging cable—nothing else to buy, since unit is *complete.*

Mail coupon for Bulletin 102 which gives full details of Hertner Type "H" Multiple circuit chargers.

The* HERTNER *Electric Co.
A General Precision Equipment Corporation Subsidiary
Motors • Motor-Generators • Generator Sets
Cleveland 11, Ohio
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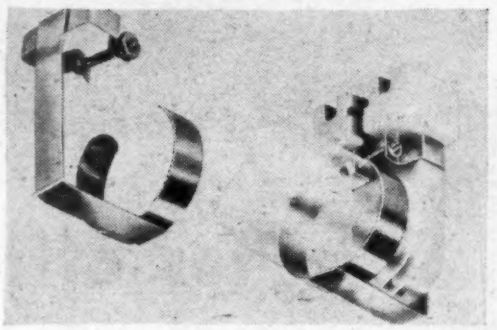
welded ball-bearing hub cannot lose balls or get out of alignment, according to the manufacturer. There are no nuts, collars, or washers. All parts are heat-treated. Uses include factory and ap-

pliance trucks, wheelbarrows, welders, and battery chargers. A solid rubber-tired wheel, vulcanized on ball-bearing hub may also be obtained. Champion Iron Works, Inc., 2223 Gratiot Ave., Dept. S, Detroit.

FLUORESCENT LAMP GUARD

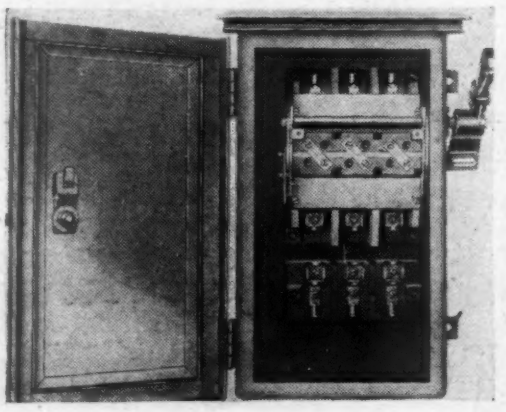
Supporting the ends of fluorescent lamps, lamp guard prevents the lamps from falling out of their holders. It is installed permanently with a machine screw and nut, and can be sprung aside for clean-



ing or relamping. Made of stainless steel, it is available in sizes for 40- and 100-watt lamps. The Den-El Equipment Co., 688 18th Ave., Irvington 11, N. J.

OUTDOOR SWITCHES

Line of Bulletin 1300, Type A switches features compact, rain-tight, dust-proof construction. Enclosures are heavy-gage steel with aluminum finish. Slanted roof has drip-trough over the front door, and a heavy sponge rubber gasket provides a tight seal between the box and the door. Interlocked switch mechanism prevents opening the door with the switch in the "on" position in both the single-door



Permanent, High Bond-Strength
FLOOR REPAIR & RESURFACING
... Won't Crack or Chip Away

Dura-Tred repairs outlast the original floor even under heaviest traffic loads and will not crack or chip away!

● Ready-mixed *Quick-Floor* makes heavy-duty repairs . . . complete in one minute. Anyone can apply it: place . . . pack . . . that's all. No waiting or drying time. Makes trucking easier, safer and faster.

● *Thin-section, heavy-duty, 4-X* resurfacer is laid to a ¼ inch finished thickness . . . provides a smooth, easy-traction surface; saves you money every time a truck is moved. Ready-mixed, easy-to-apply . . . straight edge in place, roll and it's ready to use.

Write today for details about Dura-Tred floors.

PROVED IN THOUSANDS OF INSTALLATIONS!

DURA-TRED COMPANY
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Matched to a "T"...

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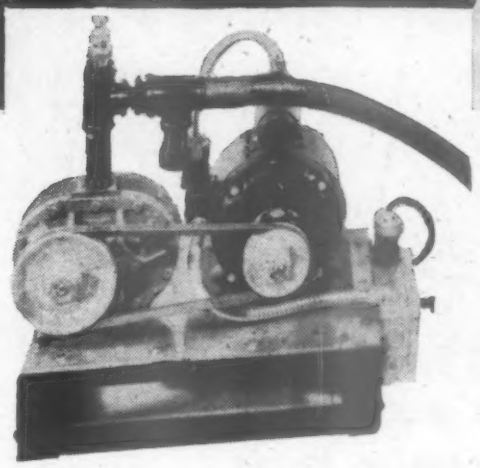


When selecting air or gas-moving equipment, watch that most important point of matching it to the job. Capacity, pressure, drive, size, weight and other factors must be carefully considered, to give you satisfactory operation.

That's where R-C *dual-ability* goes to work for you. With small-to-large sizes and many styles of both Centrifugal and Rotary Positive designs, we can be completely unbiased in our recommendations. For instance, coke oven operation called for the large Centrifugal Exhauster illustrated (top, above), with capacity of 16,850 CFM. The compact, lightweight Rotary Positive unit exactly meets the need for a low-capacity, portable vacuum pump in the graphic arts industry.

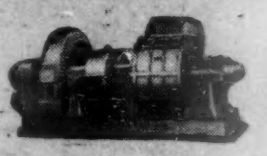
Similarly, your needs can be *matched to a "T"* with our small or large Centrifugal or Rotary Positive equipment. Call on R-C *dual-ability* to help solve your air or gas-moving problems.

ROOTS-CONNERSVILLE BLOWER CORP.
707 Central Avenue, Connersville, Indiana

VARIED REQUIREMENTS OF MOVING AIR OR GAS MET BY R-C EQUIPMENT

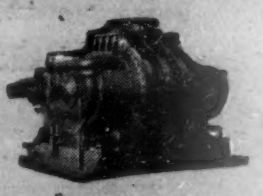
In foundries, steel and paper mills, chemical processes, sewage treatment, gas pipe lines and many widely differing jobs, R-C *Centrifugal Blowers and Exhausters* help make more goods for more people, economically.

Many engineers find *R-C Rotary Positive Blowers* better matched to the job, with their ability to deliver constant quantities of air or gas, regardless of varying outlet pressures. Our small, compact units are widely favored for built-in application.



You can closely account for air or gas, delivered or consumed, when you measure it with *R-C Positive Displacement Meters*. Their built-in accuracy needs no adjustments, can't be altered accidentally or intentionally.

Wherever natural or manufactured gases are used in processing, you'll find *R-C Rotary Positive Gas Pumps* delivering accurate quantities by the minute or the hour with unfailing regularity.



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Working with you or your suppliers, we'll apply R-C *dual-ability* to match our equipment to your jobs.

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Roots-Connersville Blower Corporation,
707 Central Avenue,
Connersville, Indiana
Please send information on:

BLOWERS_____ EXHAUSTERS_____
VACUUM PUMPS_____ METERS_____
BOOSTERS_____ LIQUID PUMPS_____
INERT GAS GENERATORS_____
NAME_____
TITLE_____

ROOTS-CONNERSVILLE ROTARY CENTRIFUGAL
BLOWER BUILDERS R-C SINCE 1854
BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS
ONE OF THE DRESSER INDUSTRIES

Doc PAX
Loosens Up A 5 O'Clock Jam.
I can't keep the men on the job until quitting time. They're griping about the 5 o'clock jam in the washrooms.
Z?!!X?! Let's go see for ourselves.
See what I mean! We lose more darn workers that way.
OUT
IN
REST ROOM
We can't build extra washrooms now. I'll call Doc Pax.
Five o'clock jam—Phooey! Why don't they use Pax.
DOC PAX
Now you won't have to worry. Pax Heavy Duty will up production too by helping to keep their hands in better condition.
Boy! I sure like this Pax Heavy Duty. That punch press grime disappears in a jiffy.
Yeah! No more dirty dry cracked hands for me. My hands look like I play Bridge for a living.
This will help solve your problems, Joe. Pax Heavy Duty gets hands clean faster. It's plenty safe and economical too.
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PAXLANOSAV*

HEAVY DUTY GRANULATED SKIN CLEANSER

For ALL General Skin Cleansing Needs

Paxlanosav Heavy Duty is a natural skin color to prevent substitution of inferior cleansers and to safeguard against the accidental use of harmful products intended for other purposes. *Its Natural Skin Color Protects Against Substitutes.*

PAXLANOSAV HEAVY DUTY EQUALS OR EXCEEDS EVERY RECOMMENDED STANDARD FOR SAFE INDUSTRIAL SKIN CLEANSERS

It's Fast!

It's Safe!

It's Thorough!

It's Economical!

Scientific formulation assures that all the ingredients will work together efficiently to get rid of the dirt quicker.

Paxlanosav Blended Emollient contains lanolin and several other beneficial oils to help prevent drying, chapping and dermatitis. Pax Heavy Duty has no free caustics and no abrasives.

Specially processed sterilized vegetable scrubber plus plenty of creamy quick-rinsing lather routs out all the deep-down grease and grime.

Healthy hands boost production, cut time lost in first aid rooms. Pax Heavy Duty cuts skin cleanser cost because it's extra-efficient. Convenient cartons prevent waste, save time, store easier.

*PAXLANOSAV
a "plus" blend of emollients including lanolin

PAX
*TRADEMARK—REG. U. S. PAT. OFF.

*TRADENAME OF G. H. PACKWOOD MFG. CO.

G. H. PACKWOOD MFG. CO.
Manufacturers of Fine Industrial Skin Cleansers
1545-55 TOWER GROVE AVE. • ST. LOUIS 10, MO.

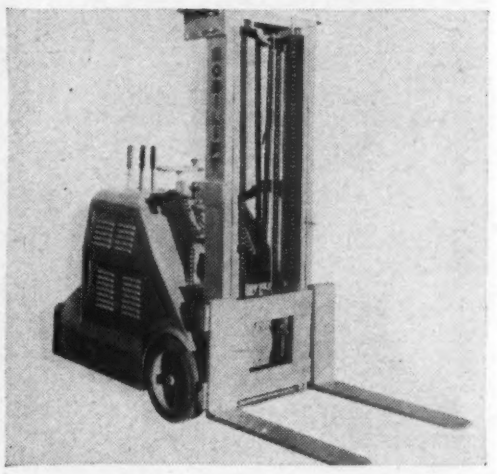
When you purchase any Pax Product you also purchase the experience and ability of Pax Technicians acquired through 31 years of exhaustive research and development.

For workers in occupations requiring contact with severe skin-defatting solvents, one extra dispenser may be installed in the wash room if desired for **PAX Sulphonated Oil Skin Cleanser**, which contains lanolin, to finish the wash *after* **PAXlanosav Heavy Duty Granulated Skin Cleanser** has been used to safely and thoroughly remove all dirt and skin irritants.

and the double-door types. Single door is standard for most sizes, with double-door construction optional. Inter-locking is obtained on the inner door of the double-door types. The Electric Controller & Mfg. Co., 2700 East 79th St., Cleveland 4.

LIFT TRUCK

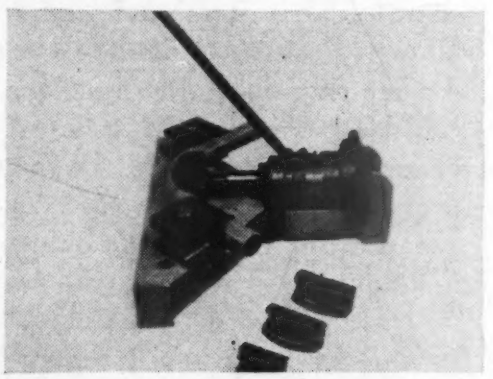
Model F Mobilift truck has a rated capacity of 3000 pounds on a 15-in. load center. Weighs approximately 4450 pounds, and is equipped with a 20-hp. 3-cylinder air-cooled engine. Requires



no gear shifting, and has an over-all turning radius of 61 inches. It is equipped with roller chain lift, available in lifting heights of 68 or 108 inches (underside of load). General Equipment Co., 835 South East Main St., Portland 17, Ore.

PIPE BENDER

Portable hydraulic pipe bender is equipped with a hydraulic jack which has screw extensions. Dies and ram extensions for 180-deg. bends can be furnished. Two sizes are available. The

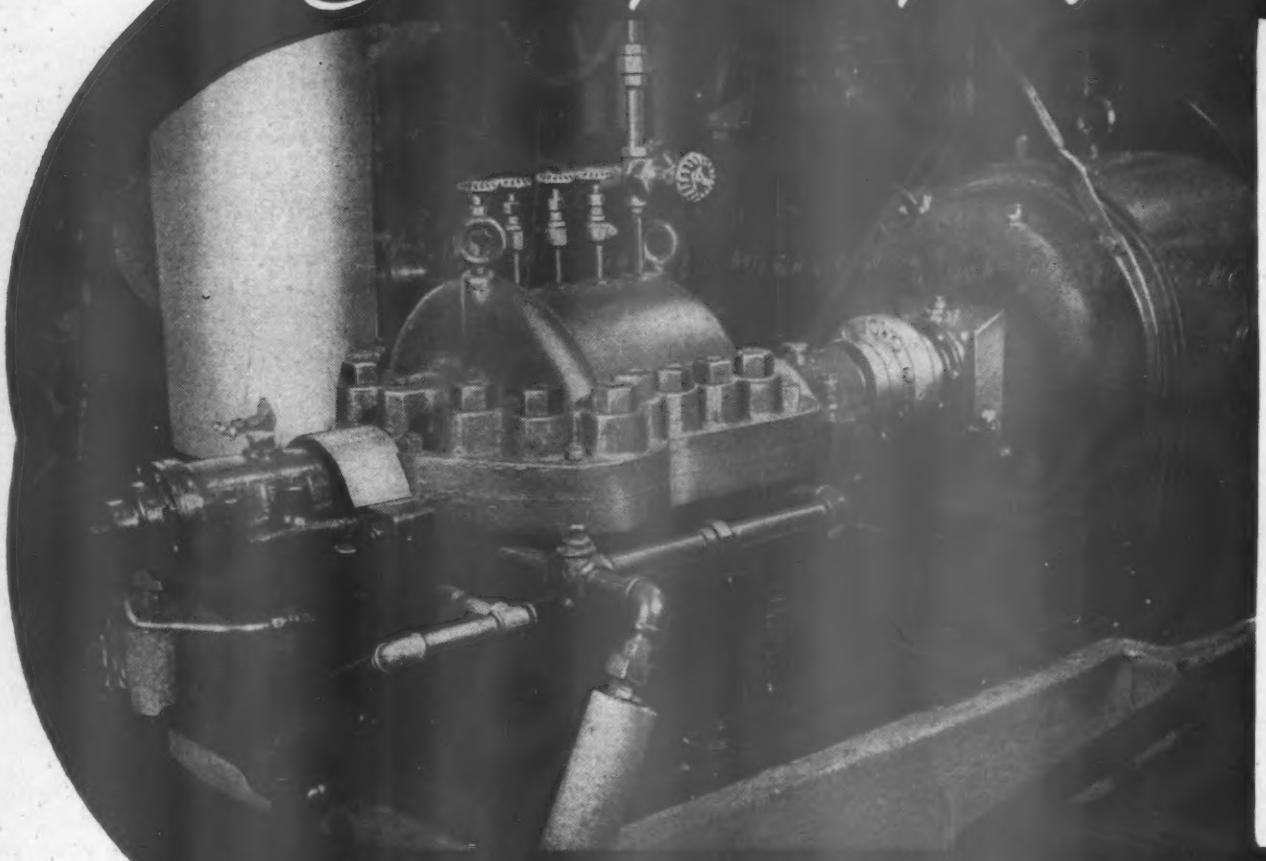


24-in. unit weighing 100 pounds includes ¾-, 1-, 1¼-, and 1½-in. dies, and the 30-in. unit, weighing 150 pounds, has 1½-, 2-, 2½-, and 3-in. dies. All parts are electric welded and reinforced. Electric Cord Co., 30 Church St., New York 7.

ABRASIVE CEMENT

Designed to eliminate slipping and tripping hazards on worn stairways and uneven floors, abrasive cement, known as Duracite, consists of a dry powder. Made into mortar by adding water, it is applied with a trowel. Forms a bond with

Hardly a sign of wear...



Can you match this record?

This relatively small boiler feed pump, delivering 250 gpm against 513 psi, required no replacement parts or reconditioning after 45,000 hours of service.

...after 45,000 hours of service

THE EXCELLENCE OF DE LAVAL design and construction is demonstrated by the performance of a De Laval boiler feed pump recently inspected after 45,000 hours of service in the municipal power plant of the City of Wyandotte, Michigan.

The following paragraph is quoted from the inspector's report:

"All machined surfaces of the case are in original condition. Diaphragms and balance arrangement fit neatly in all bores. Horizontal joint has no indication of leakage. Faces of rotating and stationary balance plates are in good condition; wear is approximately .005". Shaft sleeves are highly polished but are not worn or grooved. There is no leakage between shaft sleeve spacers and wheels. The shaft has no indication of contact with water. Wheel wearing rings show no indication of wear. No new parts were used in reassembling."

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DE LAVAL

DE LAVAL STEAM TURBINE COMPANY • TRENTON 2, N. J.

BF-2

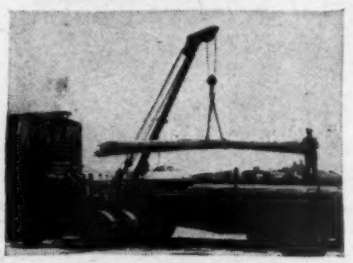
TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

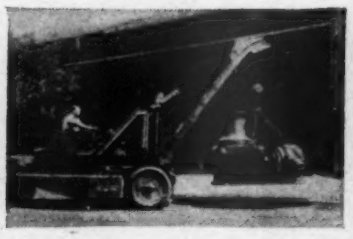
KRANE KAR REDUCES MATERIALS-HANDLING COSTS TO ABOUT 8¢ per TON

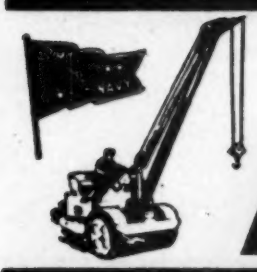
All businesses, big and small, are *mechanizing* their Materials-Handling Methods to cut costs. Case studies in various industries* show *KRANE KAR* REDUCES HANDLING COSTS TO ABOUT 8c PER TON . . . Loading and Unloading freight cars, trucks, trailers . . . Tiering, Stacking, Storing inside plant or in yard . . . in Plant Maintenance and Repairs.

KRANE KAR lifts, swings, carries, and places loads of any shape or size up to 10 tons. 9 to 37 ft. booms or adjustable telescopic booms; pneumatic or solid rubber tires; gasoline or Diesel. Electric magnet, clamshell bucket, and other accessories available. ASK FOR BULLETIN No. 69.

* *Names upon request.*







THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR
TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 855 63rd ST., BKLYN 20, N.Y.

Your SAWS are no better than your

SAW FILING...

Inaccurate saw filing can ruin the cutting efficiency of the best saws, perhaps crack or break them. The machine precision of Foley Saw Filing can increase your sawing output 25% to 40%. The Foley *automatically* joints the saw as it is filed, making all teeth uniform in size, height, spacing. Foley-filed saws run cooler, cut fast, do beautiful work—and stay sharp longer.

30-DAY TRIAL of the Foley Saw Filer is offered—to show you what a difference Foley-filed saws can make.

FOLEY Automatic SAW FILER

FOLEY MFG. CO., 3345 N.E. 5th St., Minneapolis 18, Minnesota

Please send literature on the Foley Automatic Saw Filer and details of your 30-Day Trial.

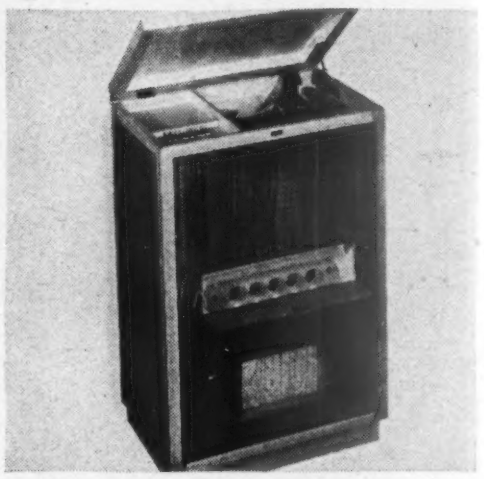
*Name*_____

*Address*_____

slate, marble, concrete, and wood bases. The surface is said to support walking traffic six or eight hours after installation, and to attain a granite-like hardness when fully set. Duane Specialties, Ltd., 388 South St., Newark 5, N. J.

SOUND SYSTEM

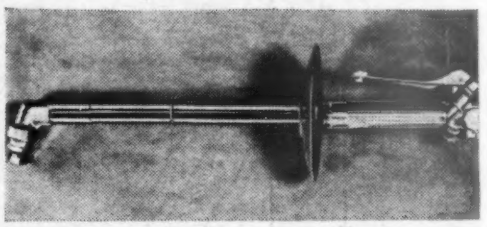
Providing voice-paging facilities, as well as work music, console Model P-20 contains in a single cabinet all the central control elements needed in a sound system requiring up to 50 watts. Power output can be increased by the addition of 50-watt district amplifiers in remote departments, and any number of micro-



phones, with their associated controls located in separated departments, can be used with the console. A voice message may be issued at any microphone location, by pressing one button, automatically cutting off any music program in process for the duration of the message. An intermix automatic record changer handles recordings of either 10- or 12-in. size and turns itself off after the last record is played. Executone, Inc., 415 Lexington Ave., New York 17.

CUTTING BLOWPIPE

Hand-operated blowpipe, for use with the powder-cutting process, cuts oxidation-resistant materials, such as stainless steels, chrome alloys, and cast iron up to 9 inches thick. In addition to oxygen and acetylene hoses, the tool, known as

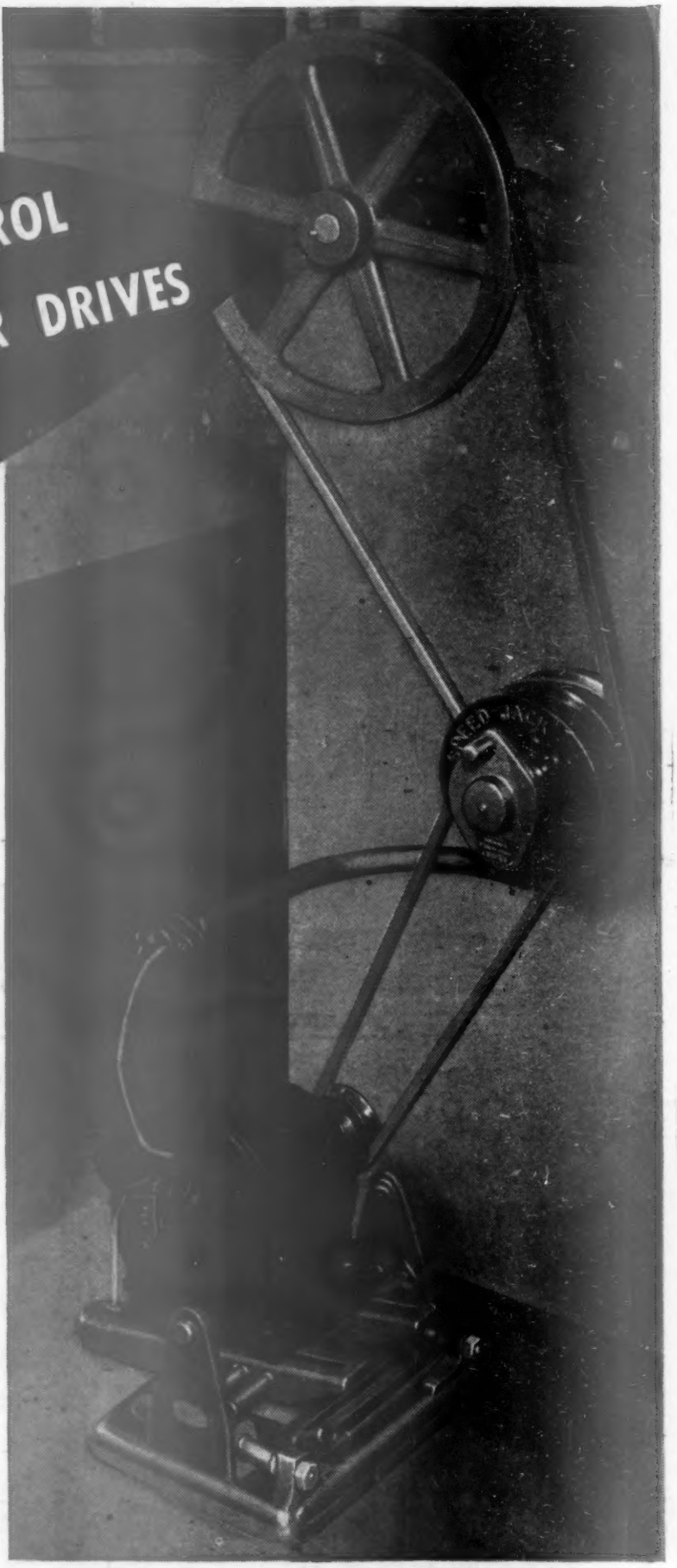


Oxweld AC-4, has a third hose which conducts the powder from a powder dispenser by means of compressed air. The same valve lever that turns on the cutting oxygen also starts the powder flow. The Linde Air Products Co., 30 East 42nd St., New York 17.

WATER SOFTENER

Liquon zeolite water softener controls distribution of the incoming hard water

HERE'S VARIABLE-SPEED CONTROL FOR FRACTIONAL-HORSEPOWER DRIVES



This new idea in variable-speed control can help you get top product quality on jobs where precise speed is a "must." American Speed-Jack Drives with *"Tailored Speed"* give you smooth *stepless* control of speed through a 3-to-1 ratio. There's no down time for pulley change-over. Your machines with fractional-horsepower drives can now take on jobs previously impossible with fixed or multiple-speed drive limitations. And you get these advantages *plus* quick, easy mounting—horizontally, vertically or *at any angle*—on your machines. Further, this versatile drive is particularly adaptable to remote control. Where your machine set-up requires mounting the unit in a hard-to-get-at position, you can now get *positive* variable-speed control through the use of a compact flexible shaft.

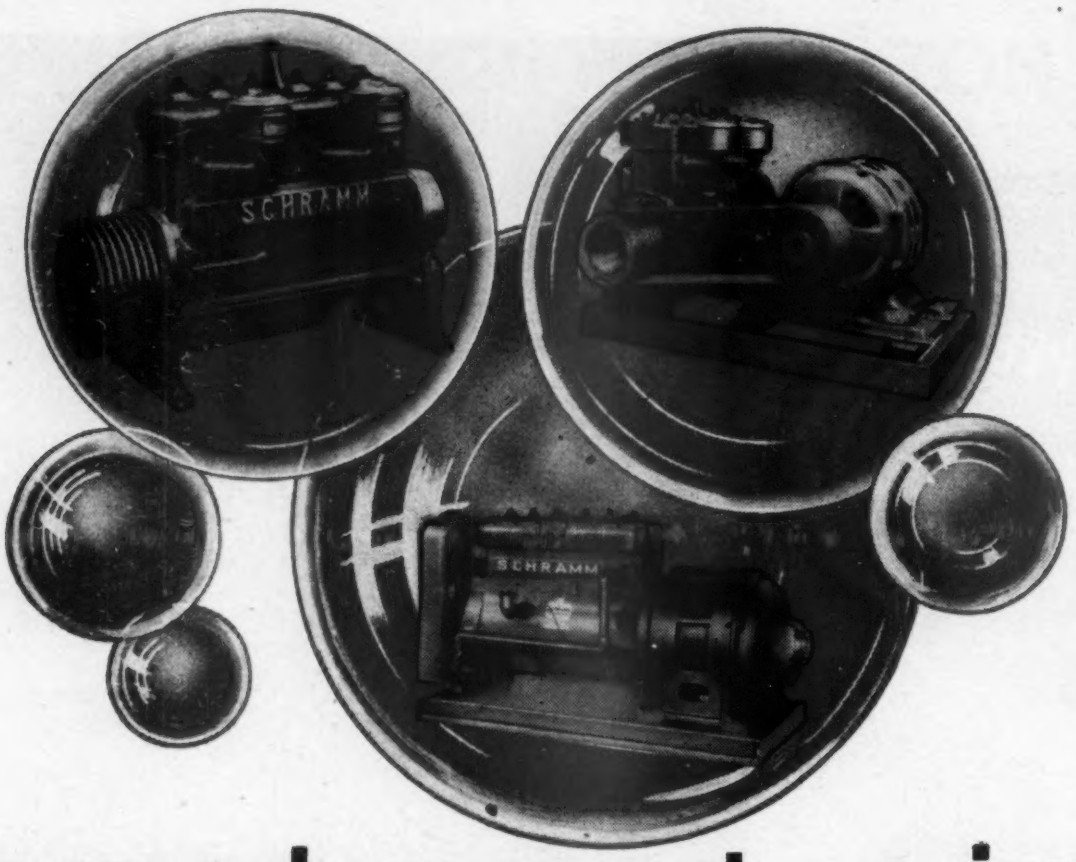
Get more information on how American Speed-Jack Drives can cut costs and boost output on your jobs where quality depends on precise speed. The Speed-Jack Drives Bulletin gives you complete construction details, dimensions and suggested applications. Drop us a line for your copy, now.

How Speed-Jack Drives Give You "Tailored Speed" For Higher Output, Reduced Down Time!

American Speed-Jack Drives enable you to quickly, easily "custom-fit" your machine speed to the individual needs of each job—without interrupting machine operation. Yes, Speed-Jack Drives enable you to actually "tailor" machine speed to job requirements for greater operating efficiency, higher product quality, lower unit costs.

The American Pulley Company

4282 WISSAHICKON AVE., PHILADELPHIA 29, PA.



packaged air

is more than a pipe dream. SCHRAMM COMPRESSORS, for example, package air every day for industrial consumption. The selection of SCHRAMM AIR COMPRESSORS is influenced by features that include: (1) 100% water cooled; (2) forced feed lubrication; (3) mechanical intake valve; (4) compact, lightweight. Designed for heavy duty, continuous service and minimum attention. There's a SCHRAMM AIR COMPRESSOR for your every need, in sizes ranging from 2 to 600 cubic feet displacement.

SCHRAMM

INC.

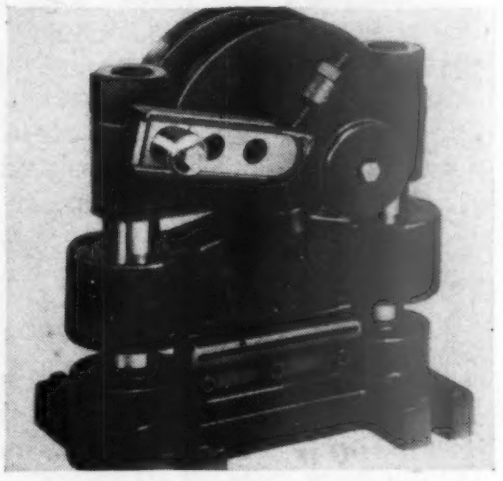
THE COMPRESSOR PEOPLE

WEST CHESTER, PENNSYLVANIA

to prevent it from channeling or short-circuiting through the bed of zeolite during the process. A similar distribution system controls flow of outgoing dirty backwash water and the incoming brine which regenerates the zeolite. Underdrain system below the zeolite bed maintains efficient collection and unimpeded flow of the softened water. The unit may be provided with a multiport valve for control of all the operations. Synthetic resin zeolite, known as Liquonex CR, has increased capacity and is non-siliceous, maker says. Liquid Conditioning Corp., Dept. F, 114 East Price St., Linden, N. J.

SCRAP CUTTER

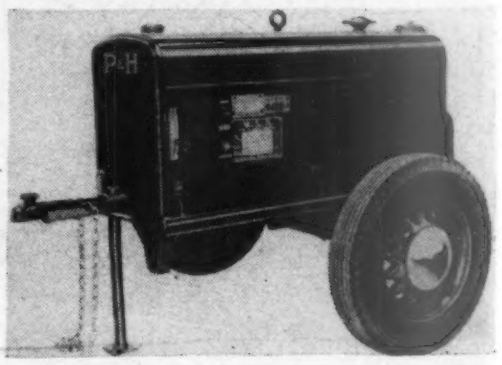
Ram-driven scrap cutter, suitable for almost any punch press, cuts stock to 4-in. width and 3/32-in. thickness. Known as Model D-611, the unit measures 6½x9¼x10 inches. It is



mounted on the bolster plate of the press, is driven directly from the ram or die, and is adjustable ram stroke of any length of up to 6 inches. The high-speed steel blades are removable for sharpening, and can be replaced. Haller Machine & Mfg. Co., Inc., 7940 Tireman Ave., Detroit 4.

PORTABLE WELDERS

P&H Model WN-200 welder, available as a stationary or trailer unit, is rated at 200 amperes, but has welding service range from 30 to 260 amperes. Engine and welder are mounted on an all-welded frame of sturdy steel tubing and heavy angle iron. The skid model can be carried on trucks. A large eye for crane lifting is provided. Carried on a running gear of standard track width, the trailer welder has pneumatic tires of



NOW *One* INSTRUMENT FOR ELECTRONIC MEASUREMENTS

WESTON ELECTRONIC ANALYZER

Incorporating:

1. ***A conventional Volt-Ohm-Milliammeter with self-contained power source.***
2. ***A high-impedance electronic Volt-Ohmmeter using 115 volt, 60 cycle power.***
3. ***A stable, probe-type, Vacuum Tube Voltmeter, for use to 300 megacycles.***

Model 769

Accurate a-c measurements .25 volt to 120 volts, 50 cycles to 300 megacycles.

Extremely small R.F. Probe (3½" x ¾" dia.). Probe constants, 5 megohms paralleled by 5 mmfd., approx.

New unity gain d-c amplifier provides absolute stability with line voltage variations from 105 to 130 volts.

D-C Electronic amplifier ranges 3 to 1200 volts at 15 megohms, resistance ranges 3000 ohms to 3000 megohms.

Conventional 10,000 ohm per volt d-c ranges 3 to 1200 volts, 1000 ohm per volt a-c rectifier ranges 3 to 1200 volts.

Resistance ranges 3000 to 300,000 ohms where a-c power is not available.

Entire Model 769 protected from external RF influences.

Uses standard commercial types of tubes replaceable without recalibration.

Size only 10" x 13" x 6⅛".

Full details from your local WESTON representative. Literature available . . . Weston Electrical Instrument Corporation, 628 Frelinghuysen Avenue, Newark 5, N. J.

WESTON *Instruments*

ALBANY · ATLANTA · BOSTON · BUFFALO · CHARLOTTE · CHICAGO · CINCINNATI · CLEVELAND
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ABOVE PHOTOGRAPHS
OF GROVER INSTALLATION IN
CADILLAC MOTOR CAR PLANT, DETROIT, MICH.

Modern mass production technique requires on-the-dot synchronizing of purchasing, delivering, processing and shipping operations. A Grover Pneumatic Tube Dispatch System is the modern way to centralize control. It can do the complete job of keeping the central office in immediate contact with all parts of the plant. This has been proved. Paper work, formulae, small parts, test batches, samples, move rapidly, accurately, privately. Time is saved, errors avoided. The investment is small alongside the many advantages. Ask a skilled Grover representative to look at your plant. There's no obligation.

GROVER

• PNEUMATIC TUBE SYSTEMS •

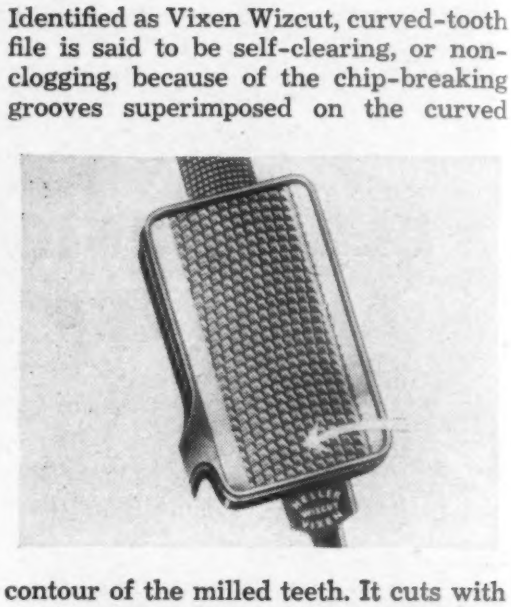
THE GROVER COMPANY • DETROIT 19, MICHIGAN

Offices in Principal Cities

standard size. Running reflectors are attached to the trailer body for safety on the highway. Adjustable front and supporting stand is used when the welder is standing alone. Ball and socket hitch and safety chains are provided. Both models are equipped with square frame arc welding generators rated 30 volts at 2900 r.p.m. Harnischfeger Corp., Welding Div., 4400 West National Ave., Milwaukee 14.

CURVED TOOTH FILE

Identified as Vixen Wizcut, curved-tooth file is said to be self-clearing, or non-clogging, because of the chip-breaking grooves superimposed on the curved



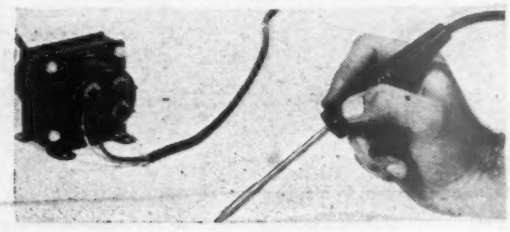
contour of the milled teeth. It cuts with a shearing action whether pushed straight ahead or at an angle. Heller Bros,. 880 Mt. Prospect Ave., Newark, N. J.

FLOOR SEALER

Named Bull Dog Tuf-Seal, a varnish-type sealer is claimed to preserve and protect wood floors under tough traffic conditions. According to the manufacturer, it sinks deep into the subsurfaces of the wood, providing a durable preservative which keeps the wood alive and prevents drying out and splintering. Available in drums, 5-gal. cans, 1-gal. cans, and quarts. Gillespie Varnish Co., Dey St., Jersey City 6.

SMALL SOLDERING IRON

Lightweight Calrod soldering iron, known as the Midget, is designed for precision soldering where space is limited, such as in instrument and meter applications. It is available with ¼- and ⅛-in. diameter tips. The 8-in. tool, weighing 1¾ ounces without cord, permits "fingertip" soldering. It is rated 25 watts, 6 volts, and is used with a 115/6-volt insulating transformer. A transformer providing 4 taps for variable heat



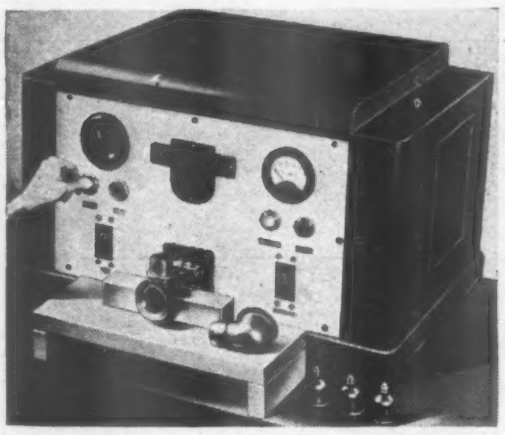
may be obtained. The heat source is built in the tip of the iron to within ½ inch of the working end, to reduce heat loss and speed heat transfer. Industrial Heating Div., General Electric Co., Schenectady 5.

PUMP GOVERNOR

Eliminating stuffing box and rubber diaphragms, line of pump governors is designed for accuracy of control and resistance to wear and erosion. Hard surfaced seat rings, 800 Brinell hardened stainless steel main valve, and 500 Brinell cylinder liner reduce wear. The hard seating surface is applied as a welded section to seat rings of bronze governors and to the main body of steel governors. Spring range permits settings without change of spring or diaphragm. Replacement parts are interchangeable without removal of the body from the line. Available in sizes from ½ to 4 inches, for inlet pressures from 40 to 600 p.s.i., at temperatures to 75 deg. F. Leslie Co., 112 Delafield Ave., Lyndhurst, N. J.

INDUCTION GENERATOR

Ther-monic Model 43 750-watt bench-type induction heating generator plugs in any 120-volt, 60-cycle single-phase power supply outlet. Full-load output is 43 B.t.u. per minute. The generator combines power section and work applicator in the one unit. It can be used for continuous full-load operation, or for short run work, and is adaptable to all types of mechanization. Coil leads facilitate frequent work change-overs. Tube com-



plement consists of one standard heavy-duty, air-cooled, shock-mounted oscillator, and two standard rectifier tubes. Equipment is protected by plate overload circuit breaker and an instant line circuit breaker, as well as an interlock switch. Induction Heating Corp., 389 Lafayette St., New York 3.

SOLDERING IRON

Hatchet-type electric soldering iron, designated Catalog No. 300 H, facilitates reaching inaccessible spots without stooping or bending over the work. Heating element is housed in a hexagon-shaped barrel which protects it from mechanical injury, and permits clamping in a vise for tip removal without

SAVES 51% ON PACKING

Aetna Plywood & Veneer Company, large Chicago distributor, cuts crate weight 75 pounds, and saves labor and material with Acme Steelstrap methods

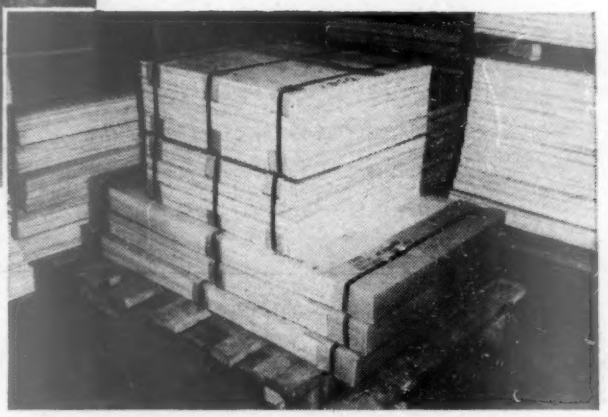
If packing materials were expensive and hard to get, if labor were scarce and costly, what would you do?

Aetna called Acme's Shipping Specialists. Here's what happened: (1) Quantity of crating materials was reduced. (2) Labor time was cut from 25 minutes to 5 minutes per bundle. (3) Bundle weight was reduced by 75 pounds. (4) Fewer men handle a much larger volume than was previously possible. (5) Heavy carrier penalties on improperly packaged L.C.L. and truck shipments are avoided.

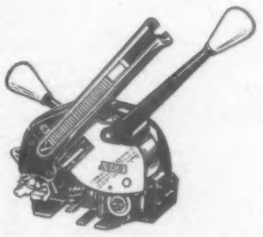
Acme's Shipping Specialists are located in principal cities. They are ready to work with you to help solve your general or specific shipping problems *without obligation*.

Send the coupon below or write for a booklet containing more true case histories of shipping problems in various industries which have been solved by Acme Shipping Specialists and Acme Steelstrap methods.

Old crating method—For one size plywood, crate cost $1.39 for lumber and $.375 for labor—a total of $1.765. Total weight, 350 pounds; contents 20 pieces.



Acme Steelstrap and Corrugated Sheets—materials cost per bundle, $.775, and labor, $.075—a total of $.85. The bundle weighs 275 pounds and contains 20 pieces.



More savings ahead for Acme Steelstrap users—No. 3 Steelstrapper, the lightest tool made, is now available. Magazine holds 100 seals. Tensions, seals, and cuts the strap in one operation. Small base requires only 5-inch strapping surface. Two levers working in opposite directions make for better balance and easier handling.

Acme Steel Company, Dept. FM-77
2838 Archer Avenue
Chicago 8, Illinois

Please send me a copy of your case history booklet, "SAVINGS IN SHIPPING."

Name.....

Company.....

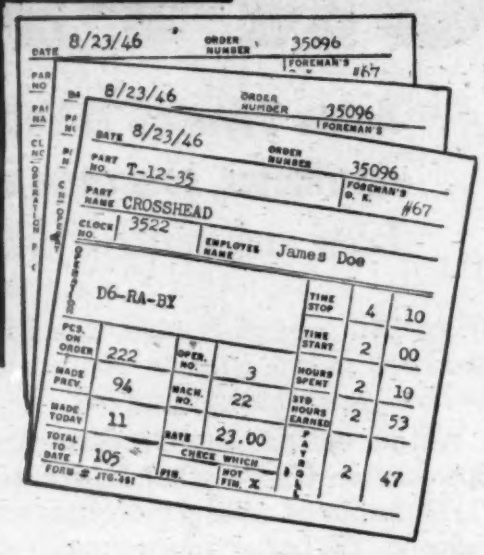
Address .....

City.....Zone....State.....

ACME STEEL COMPANY

ACME STEEL CO. CHICAGO

NEW YORK 7 ATLANTA CHICAGO 8 LOS ANGELES 11



Why not apply Work Simplification to your Control Systems, too?

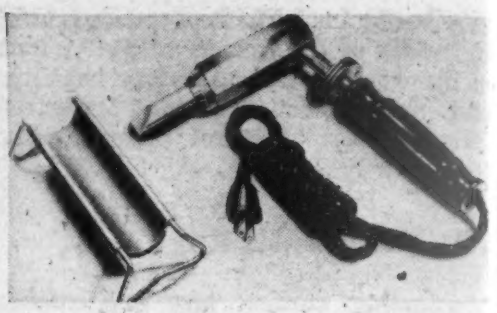
Compare the use of McCaskey multiple copy forms and "visible-filing" for Production Control, Payroll and Cost records with the usual posted procedures. The difference in essential operations shown by a simple flow chart is most revealing. McCaskey eliminates numerous handling and posting operations. The advantages of visible records, immediately available also, add savings in both handling and time.

Barrett-Cravens Company, Chicago, made such a comparison in 1943 and adopted McCaskey for individual controls of special production orders and stock parts. A few of the important facts they secure, for example, with *only one writing* of their McCaskey triplicate time tickets are:

(1) Status of every production order, special or stock, visualized within minutes after the completion of an operation;
(2) Operation cost data immediately available for analysis and investigation of variations;
(3) Accurate, up-to-the-minute data reduce dependence on stock chasers;
(4) Incentive pay-roll records checked and quantity count verified;
(5) Verified record of production for operators on incentive work, preventing disputes and dissatisfaction.

Write for a demonstration and suggestions for an application to your particular needs – – – – or send for a copy of "The ABC's of Production Control" and other descriptive folders.

McCaskey INDUSTRIAL CONTROLS
PRODUCTION • INVENTORY • TOOLS • COSTS • PAYROLL
THE McCASKEY REGISTER COMPANY, ALLIANCE, OHIO
McCaskey Systems Ltd., Galt, Canada The McCaskey Register Co., Watford, England



injuring the heating element. The iron features a high-heat alloy core built to resist scale, a 6-ft., 10,000-cycle heater cord, and a shatterproof rubber plug. Heating elements are of nickel-chromium resistance wire, insulated with mica. Tips are hard drawn copper, and terminals are accessible. Handle also is removable. The iron is furnished with a stand. Hexacon Electric Co., 105 West Clay Ave., Roselle Park, N. J.

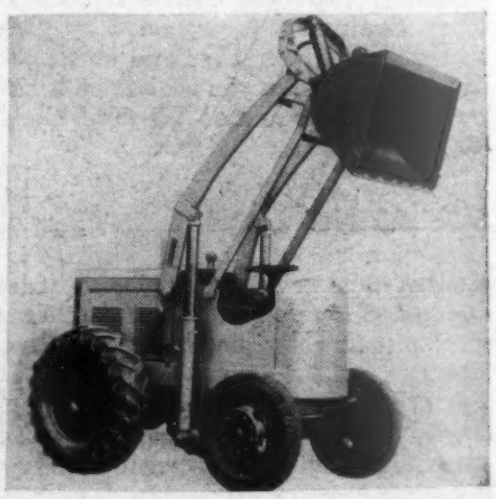
SAFETY CONTAINERS

Line of safety containers, called Safe Guard, for storing and carrying flammable and volatile liquids, is made in 1-, 3-, and 5-gal. sizes. Also said to help prevent loss through evaporation of such non-flammable fluids as carbon-tetra-

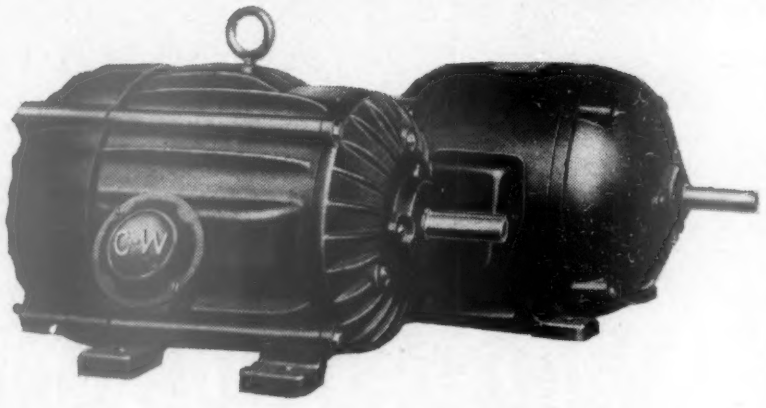
chloride, insecticides, and anti-freeze. The containers are constructed of terne plate, lead-coated inside and out, and are finished in red enamel. The pouring spout is of non-sparking die cast brass. If tipped over, leakage is held to a minimum. The two larger sizes have a reinforced bottom to protect them against rough usage. The General Detroit Corp., 2272 East Jefferson Ave., Detroit 7.

SHOVEL

Model HF Payloader, a ¾-yd. shovel, incorporates a 4-speed reversible transmission which provides practical forward digging speeds and high reverse maneuvering speeds with a minimum of shifting. A single lever shifts gears into the desired speed range, and forward or reverse can then be controlled by flip-



THE HANDS THAT DESIGNED THESE AC MOTORS HAD 21,900 DAYS OF EXPERIENCE



Crocker-Wheeler know-how, acquired through 60 years of manufacturing quality electric motors and generators, has broadened its horizons. A new ownership and management assumed control of this pioneer company during the war. This new management has developed Crocker-Wheeler's production and research facilities to match the recognized superior quality of its products.

Infused with modern methods, progressive management and millions of dollars for retooling, Crocker-Wheeler is now building in large quantity two great new lines of induction motors, combining the traditional Crocker-Wheeler quality and experience with manufacturing methods and tools as modern as tomorrow.

The New PROTECTED-TYPE BA and the New SEALEDPOWER-TYPE C (totally-enclosed, fan cooled) induction motors are only two of the improved machines Crocker-Wheeler has perfected with skill and knowledge gained from 60 years of background and experience . . . Built to do *your* job even better than before. CW-19

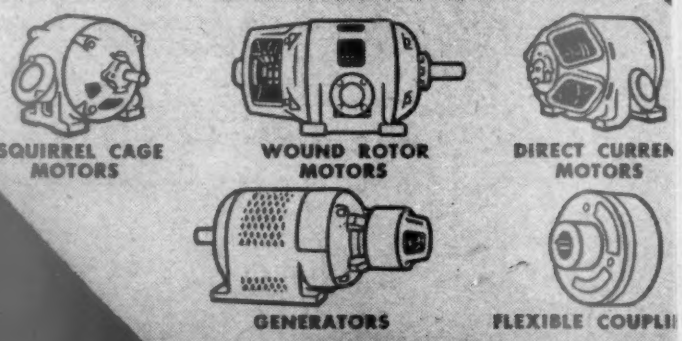
KEEP YOUR EYE ON CROCKER-WHEELER

CROCKER WHEELER

ELECTRIC MANUFACTURING COMPANY, AMPERE N. J.

Division of Joshua Hendy Corporation

Branch Offices: Boston, Chicago, Cleveland, Los Angeles, New York, Philadelphia, Pittsburgh • Representatives in Principal Cities



Keep Exterior Walls Healthy with
HYDROCIDE Colorless

Continual exposure to changing weather conditions is eventually as hazardous to a brick, concrete, masonry or stucco structure as to a human being. "Weatherizing" exterior walls with the proper water-repellent treatment — HYDROCIDE Colorless — will help keep them healthy through rain and snow, heat and cold.

HYDROCIDE Colorless is not affected by extremes of temperature . . . remains fluid at low temperatures and will not show separation and precipitation. It is free of resins, wax, and other non-penetrating matter.

Since HYDROCIDE Colorless forms a transparent film, it does not mar the original beauty and appearance of the surface. Absorption of dust, soot and stains is checked. Application is easy — by brush or spray.

Two types: HYDROCIDE Colorless "G" for relatively dense surfaces — HYDROCIDE Colorless "D" for porous light colored surfaces.

WRITE FOR *FREE FOLDER* on
extending life of exterior building walls.

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Floor Treatments • Waxes • Paints and Protective Coatings • Concrete and Mortar Admixtures • Waterproofing and Dampproofing • Caulking Compounds Roof Coatings

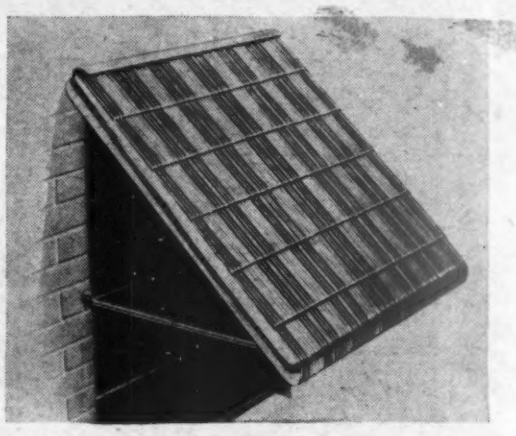
IF IT'S WORTH BUILDING IT'S WORTH SAVING

Building Products Division, **L. SONNEBORN SONS, INC.,** New York 16, N. Y.
In the Southwest: Sonneborn Bros., Dallas 1, Texas

ping a directional lever. The bucket is operated by hydraulic power, controlled by one lever. Bucket may be dumped completely or gradually at any height. Automatic bucket tip-back permits full bucket capacity, and prevents spillage of loose materials. Large wheels, equipped with hydraulic brakes, simple automotive type steering, and complete visibility in all directions are added features. The Frank G. Hough Co., Libertyville, Ill.

STAINLESS STEEL AWNINGS

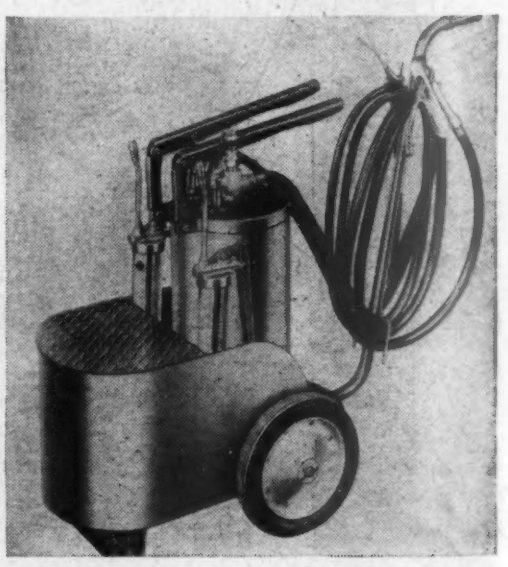
Made of rustless, stainless steel, permanently spot welded, awnings are fireproof, impervious to acid fumes, coal dust, and severe climatic conditions. Construction is tubular-strut type for light weight and rigidity. May remain on building all year, or be removed and compactly folded for storage if desired. The awnings do not leak, because each strut serves as a rainspout, and hanger



strip is permanently anchored and calked to the building. They provide rain and sun protection, with ventilation, and no trapping of static heat against the windows. Available in size increments of 6 inches, length and width, to meet requirements. Perma-Steel Corp., 2025 Fenkell Ave., Detroit.

LUBRICATING CART

Lube service cart is a complete lubrication department on wheels. Needs no air or electric connections. Eliminating frequent trips to the oil storage room, it carries a supply of three different lubricants (two greases and one oil). The one-man-operated cart, mounted on two semi-pneumatic tires, includes two 1-lb. lever guns and one ½-pt. pistol oiler. Pressure lube pump has built-in gun loader for hand guns. Front section of cart incorporates a large toolbox with



Coming

THE GREATEST INDUSTRIAL SHOW ON EARTH

SEPT. 17-26

Machine Tool Show

AT THE DODGE-CHICAGO PLANT

Make your plans now to be there. Attend the first Machine Tool Show that has been held in twelve years. There will be 12 acres of exhibits in the Dodge-Chicago Plant (now the Tucker Corporation Plant), where the engines for the B-29's were formerly made. It's the BIG show for the entire metalworking industry. Nowhere else in America is there sufficient floor space to display, under one roof, all of the exhibits of the 1947 Machine Tool Show.

INDUSTRIAL LEADERS AND PLANT OPERATORS FROM ALL OVER THE WORLD

More than 100,000 management, production, engineering, purchasing and financial executives from all over the world are going to be there. You'll find the answers to some of your present and future problems at the Machine Tool Show. You can't afford to miss it.

TOOLS NEVER BEFORE EXHIBITED

The latest equipment and newest developments will be here, ready for your inspection. The products of over 250 manufacturers—more than 1,000 new machine tools, forging machines and other metalworking machinery and equipment, of all sizes and types, will be in full operation.

TECHNICAL DEVELOPMENTS AND FUTURES

In addition to the exhibits, the Machine Tool Congress will hold nightly sessions devoted to the presentation of papers, by recognized authorities, covering outstanding new developments in metalworking techniques and processes. All who attend the Show may attend the Congress. Your badge is your admission.

WRITE FOR COMPLETE INFORMATION

Make your plans now, to attend. Send in your advance registration today. If you have not already received your copy, ask for the booklet containing information about hotel reservations, transportation from downtown Chicago to the show, etc.

AVOID DELAY AT THE GATE

Send in an advance registration blank now. Your official registration will then be completed and mailed to you, and becomes your admission to the show.

MAIL YOUR ADVANCE REGISTRATION TO:

National Machine Tool Builders' Association
10525 Carnegie Avenue, Cleveland 6, Ohio

ADVANCE REGISTRATION

Name _____
(Please Print)
Title or Position _____
Company _____
Address (in full) _____

The Registration Fee is $1.00. Checks should be made payable to the Machine Tool Show

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Closed Sunday
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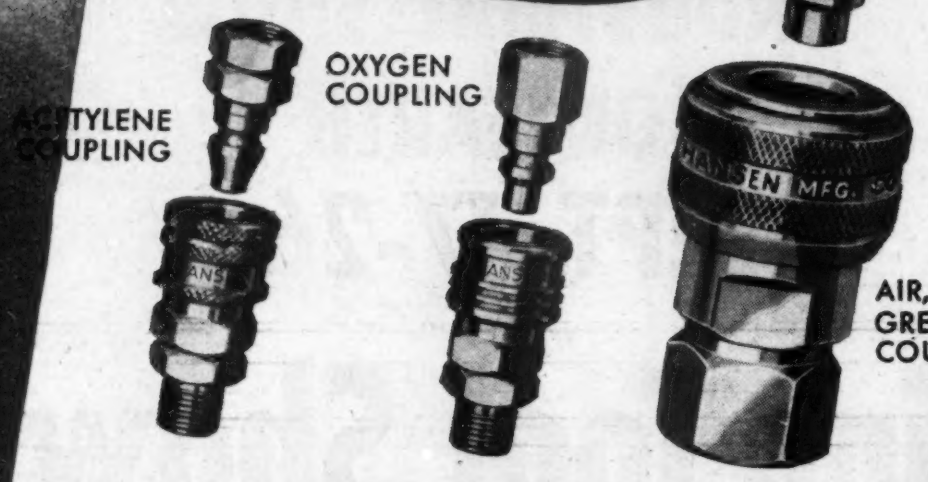
Please Check Dates Of Attendance

HANSEN *Couplings*
Are Used On a VARIETY of JOBS



EACH DAY a new use is found for Hansen Couplings, proving their adaptability, versatility and right design. Hansen couplings have made their mark in many fields and their long list of accomplishments is growing longer each day.

There is a specific Hansen coupling made for air, oil, grease, oxygen, and acetylene, and they come in a wide range of standard sizes.

Hansen couplings are simple and easy to operate... merely push plug into socket, coupling is connected and locked...slide sleeve back with thumb, coupling is unlocked and disconnected. Hansen couplings are rugged, with all moving parts fully protected, consequently they will stand up under rough usage. Complete swivel action prevents kinking of hose. They can be readily incorporated in new or existing equipment.

Our representatives will be glad to discuss with your engineers the possibilities and many advantages of Hansen couplings. Send for illustrated catalog.

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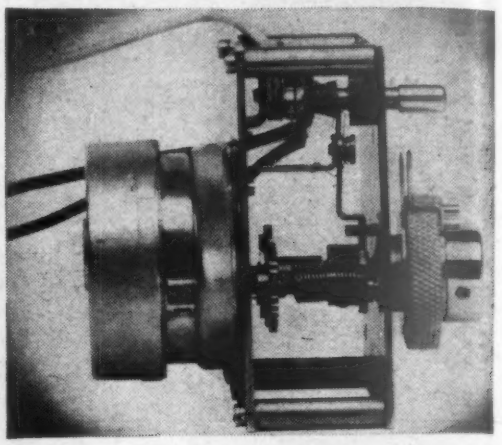
THE HANSEN MANUFACTURING CO.
1786 EAST 27th STREET • CLEVELAND 14, OHIO

hinged lid, which also serves as a platform step for the operator to reach high bearings. Gray Co., Inc., Industrial Div., Graco Square, Minneapolis 13.

RESET TIMER

Electric circuits may be controlled by automatic reset timer P 147-60, which starts at the touch of a button. Built for permanent panel installation, it comes in time cycle ranges of 15, 30, and 60 seconds, 5, 15, and 30 minutes. The 3x3x2½-in. timer is composed of two mounting



plates, a reset synchronous motor, open-type jack switch, reset button, cam latch, torsion spring to return motor to original position, indicator actuated by motor, and adjustable stop held in position by friction clutch. Internal parts are brass or cadmium plated steel; external parts are chrome plated. Timer operates on 110 volts, 60 cycles a.c., with a 1500-watt capacity. Portable Model P 134-60 is available in the same ranges. American Time Corp., Springfield 1, Mass.

PLASTIC FLOOR TILE

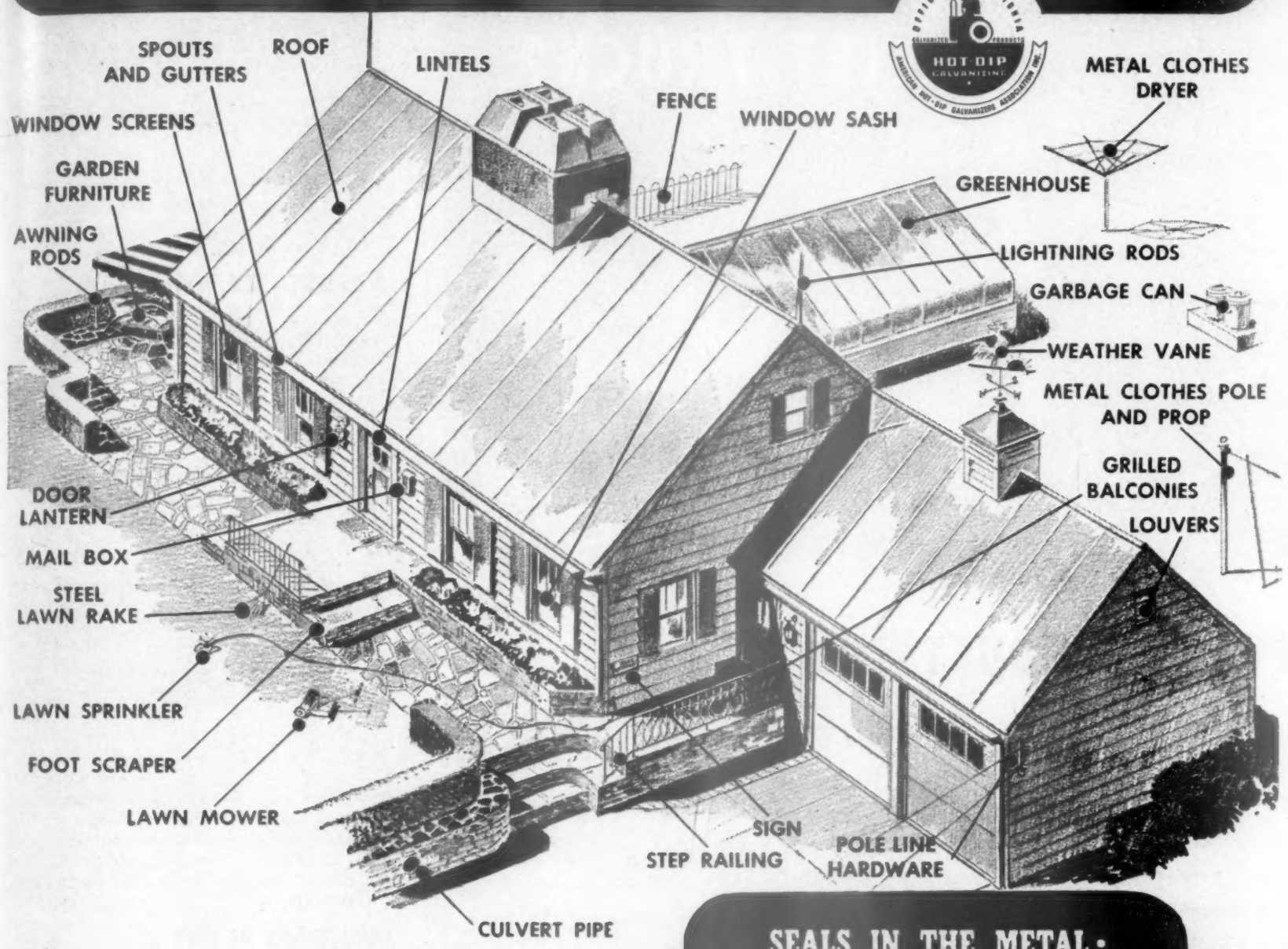
Laminated plastic floor tile, named Plastile, is said to have high sound absorption qualities. Composed of a 3/32-in. layer of vinyl compound bonded to a 3/32-in. resilient base of synthetic impregnated cork, it comes in standard tile sizes of 8½x8½ and 9x9 inches, and in sheets 35x35 inches. The natural adhesives in the synthetic resins bond the plies together, increasing resistance to wear under heavy foot traffic. The material is claimed to be unaffected by acids, alkalis, oils, grease, abrasion, cleaning fluids, or cigarette burns, to need no waxing, and to be non-slippery when wet. The U. S. Stoneware Co., Akron, Ohio.

ELECTRONIC ANALYZER

Model 769 electronic analyzer permits voltage, current, and resistance measurements covering frequency ranges of practically all present electronic applications. Embodies a stable high-frequency vacuum tube volt-meter, an electronic volt-ohmmeter, and a complete 10,000-ohm-per-volt d.c. and 1000-ohm-per-volt a.c. multimeter, all mounted in an oak carrying case. The vacuum tube volt-meter covers a range of 50 to 300 megacycles, at ranges of 3/12/30/120 volts. The probe is equipped with a flexible cable for plugging in front panel. Power requirements are 105 to 130 volts, 50 or 60 cycles a.c. The electronic volt-ohmmeter covers ranges from 3 to 1200 volts, and 2000 ohms to 2000 megohms full scale. The analyzer section has six 10,000-ohms-per-volt

DIPPED IN MOLTEN ZINC

For the utmost in Rust Prevention



Today, Architects and Builders are relying more and more upon Hot-Dip Galvanizing for the utmost in rust prevention for exposed metal structures.

SEALS IN THE METAL · SEALS OUT THE ELEMENTS OF RUST AND CORROSION

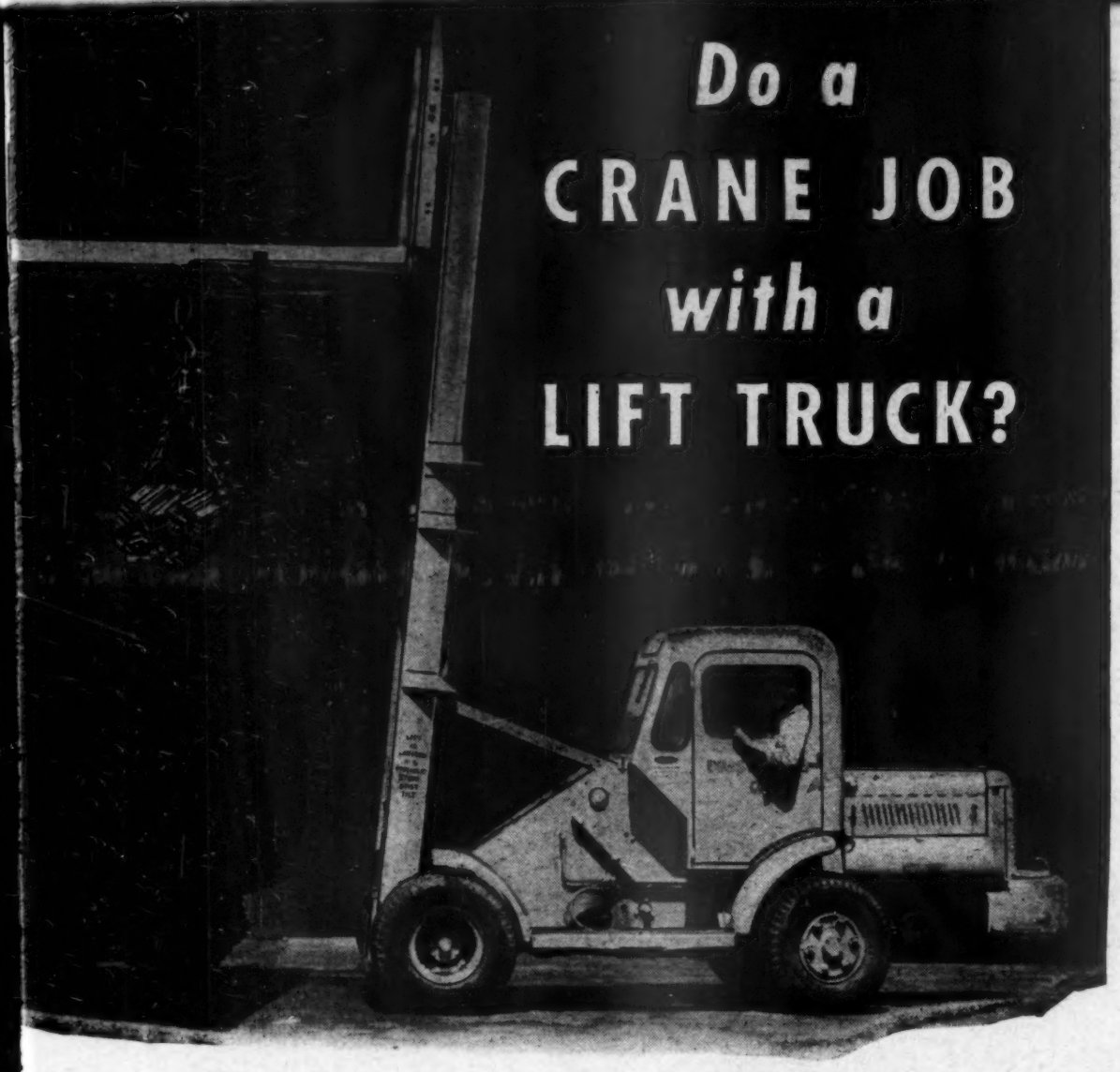
Hot-Dip Galvanizing is the only process which creates a bond of iron-rich alloy that holds the best possible protective coating of rust-resisting zinc to the base metal.

Hot-Dip Galvanizing has been time-tested under every climatic condition. Records, through the years, definitely prove that while metal is sealed in zinc by the American Hot-Dip Galvanizing method it cannot rust.

Hot-Dip Galvanizing is your best insurance against rust and corrosion. In giving added life to property, in saving expensive maintenance and replacement costs, Hot-Dip Galvanizing is an investment that *does pay dividends.*

Concerning *your* problems of rust and corrosion write American Hot Dip Galvanizers Association, Inc., First National Bank Bldg., Pittsburgh 22, Pa.

***For the best Zinc Coating use* hot-dip GALVANIZING**

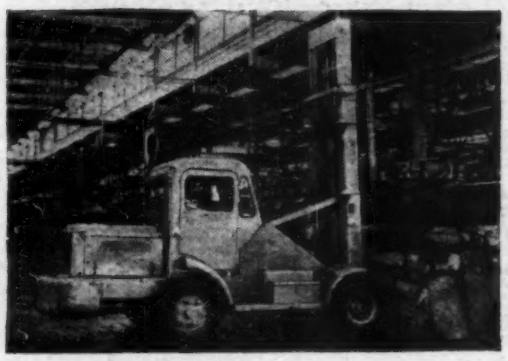


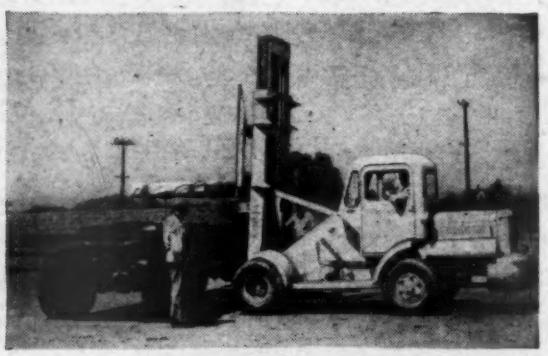
Do a CRANE JOB with a LIFT TRUCK?

EVANS PRODUCTS CO. does it ... with a ROSS

This ROSS 12 HT equipped with a ROSS channel boom cuts dozens of man hours off unloading time at Evans Products. The channel boom, like other ROSS attachments, makes one ROSS Lift Truck serve for two, or more, specialized machines. The channel boom slips off in a matter of seconds — no pins, bolts, or clamps — and the ROSS is ready for regular lift-truck work. Pneumatic tires make heavy load handling easy indoors and out, in all kinds of weather. Here's a lift truck that does any number of jobs around your plant — and cuts off a lot of man hours on every one. Capacities range from 5,000 to 18,000 pounds.

Take a tip from Evans — let a ROSS *cut your handling overhead*





Rely On ROSS

THE ROSS CARRIER CO.

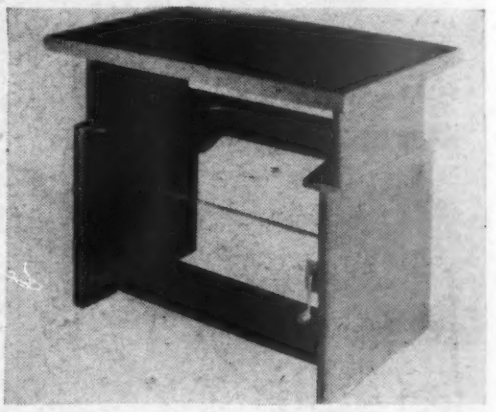
295 MILLER STREET, BENTON HARBOR, MICHIGAN, U.S.A.

Direct Factory Branches and Distributors Throughout the World

voltage ranges, six rectifier type a.c. voltage ranges to 1200 volts, three ohmmeter ranges to 200,000 ohms, and six d.c. ranges to 600 ma. Western Electrical Instrument Corp., Newark 11, N. J.

ADJUSTABLE WORK TABLE

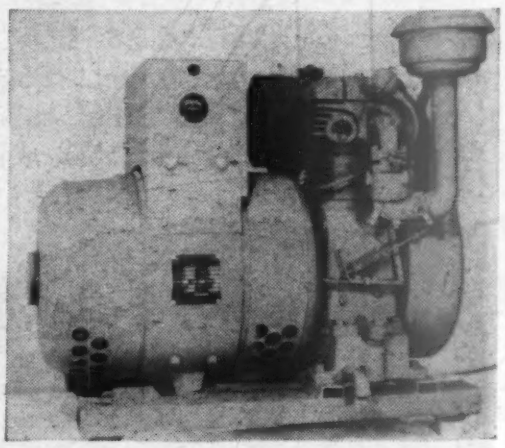
Range of working heights extending from 26½ to 37 inches is provided by adjustable work table. Hand crank on right side of table adjusts it to the most comfortable position for the worker. Constructed of heavy-duty plywood



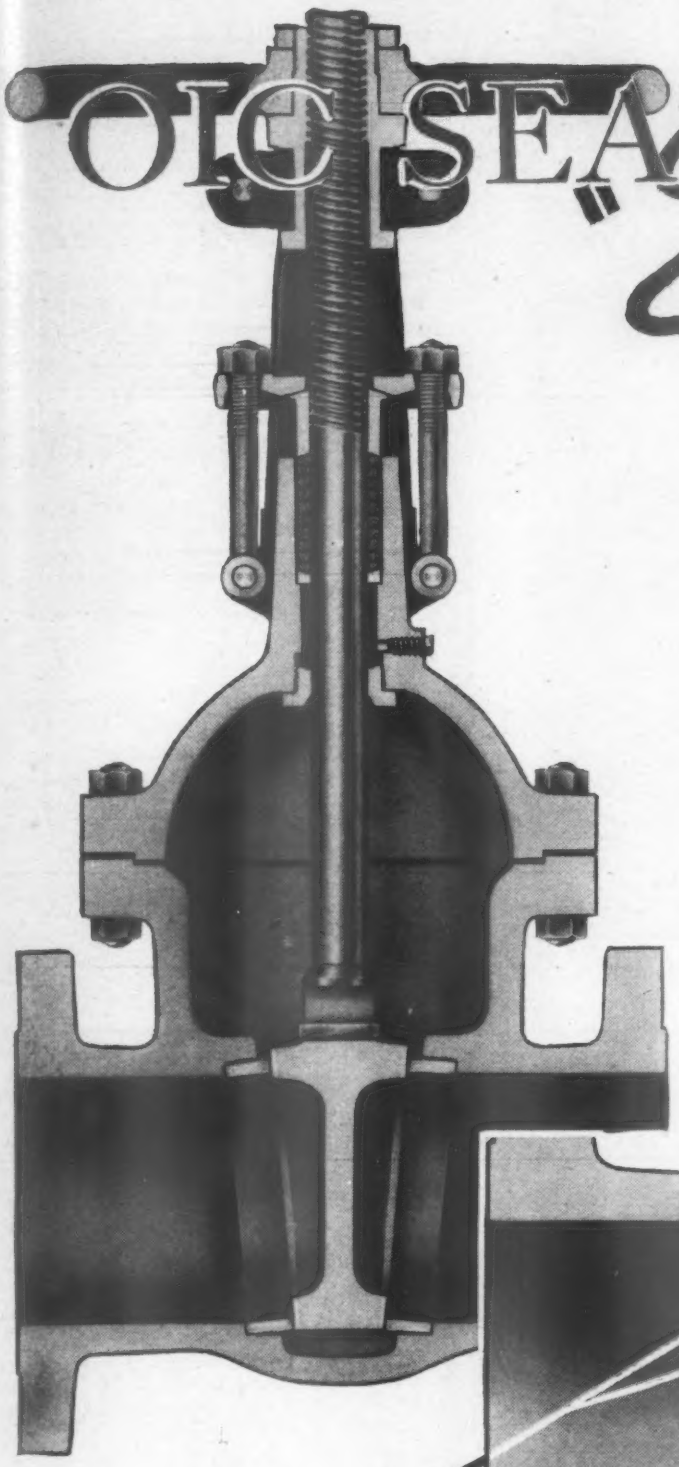
with steel gears, the table is mounted on gliders. The standard top, 48x30 inches, is made of tempered masonite. The table will hold a working load up to 300 pounds. Haskell Mfg. Co., 207 Penn Ave., Pittsburgh.

LIGHTING PLANT

Combined a.c.-d.c. lighting plant, with capacity of 2500 watts a.c., is self-excited, cranking from 24 volts of battery. The d.c. winding has sufficient capacity to charge a standard 32-volt glass jar type battery. The plant has battery charging relays, and charging rate automatically adjusts itself. It may be furnished with full automatic or remote control. Voltage regulator holds a.c. voltage within 5 volts change between no load and full load. The generator is mounted directly on side of a Briggs & Stratton ZZP, 1-cylinder engine. Entire unit is mounted

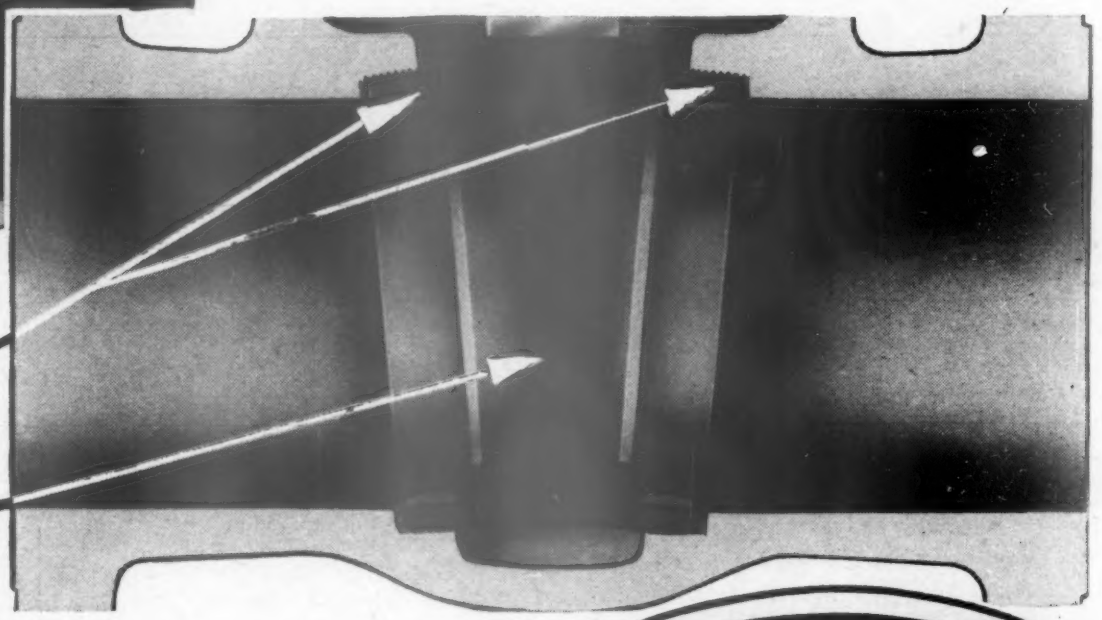


OIC SEAT RINGS "Sit tight"



TO STOP LEAKS, get your steel gate valves from OIC, designers of a modern and *different* type of seat ring that *"stays put"* even under severest service conditions! In this advanced OIC design, the ring is "backed up" by the solid wall of the valve body, as shown in the diagram. That means that even if the wedge is accidentally jammed hard against it, this ring cannot tilt, shift or loosen. In fact, any force against the OIC seat rings presses them more tightly in place against the body wall!

Another advantage of this OIC design is that it makes possible a thread area *considerably greater* than that found on most conventional seat rings in the same size of valve. All this means positive tightness . . . protection against rough usage . . . less maintenance . . . longer life . . . true economy.



See the new OIC *film*

OIC
SETS THE PACE IN VALVES

Don't miss OIC's new sound slidefilm, "OIC Sets The Pace In Valves!" It's designed to give you the latest, most up-to-date information available on valve manufacturing and valve use. If you would like a private showing in your office—no obligation, of course—just write, giving your name, title and Company, to: **The Ohio Injector Co., Wadsworth, Ohio.**

OIC
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O-847-3

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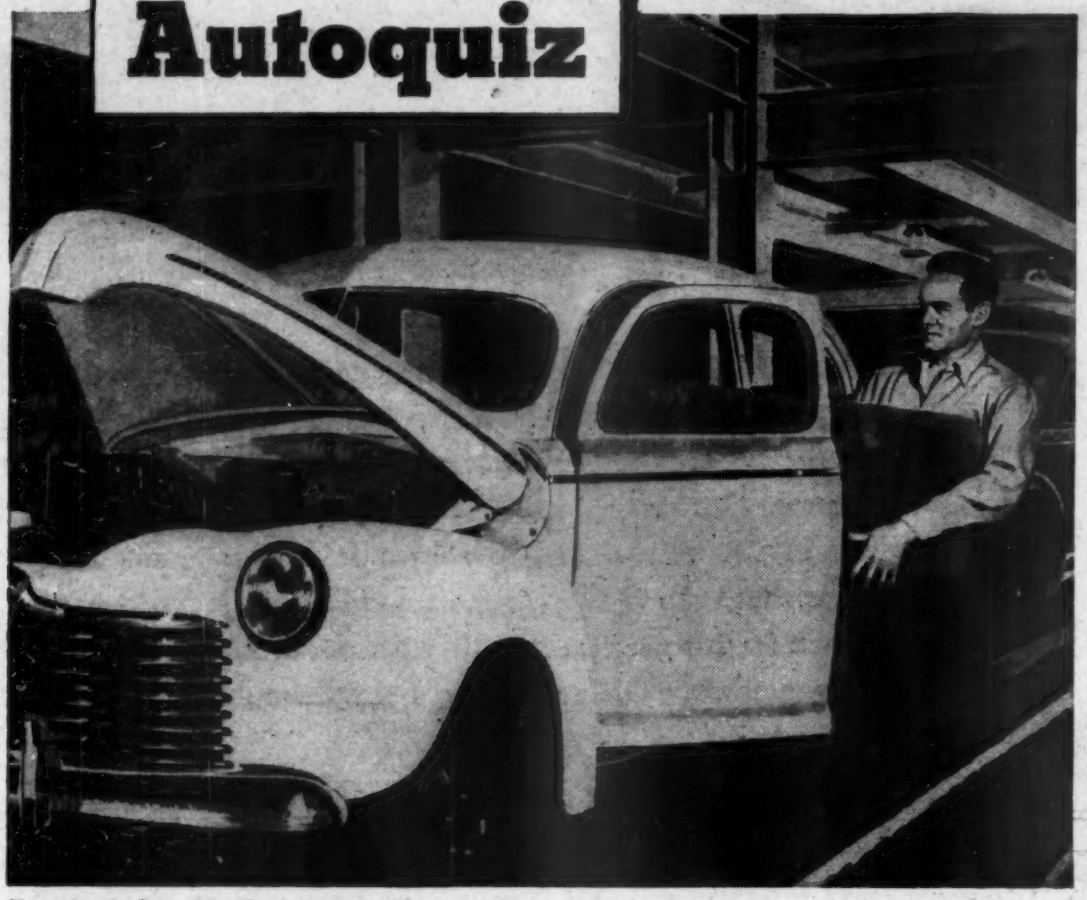
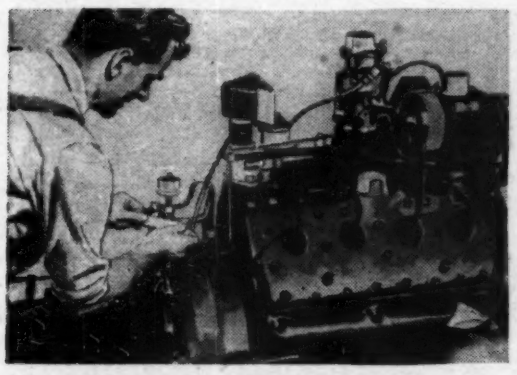


How long does it take to assemble a car?
Cars roll off assembly lines as fast as one every forty-five minutes. To help speed production and cut costs all along the line, Permacel pressure-sensitive tapes are used. Permacel moistureproof cloth tape fits and holds foamed-rubber cushions in place. Permacel tapes are also used for color-separation painting and bundling related parts of subassemblies.



About how many parts in a car?
One leading make has 12,000 separate parts. Openings of motor parts—such as oil ventilators, exhaust outlets, gas intakes, etc.—are protected against dirt with Permacel cloth tape. After motor is installed in chassis, Permacel is quickly removed.

How are cars shipped abroad?
Bodies are disassembled from chassis—quantities of each are crated together. Permacel moistureproof cloth tape is used to keep brake drums, engine, and radiator openings, free from rust. This makes reconditioning plants abroad unnecessary.

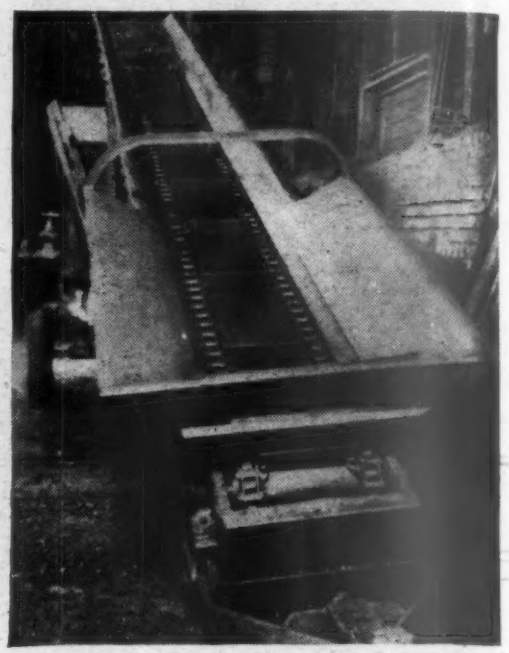
What are some other uses of tape in the automobile industry?
Permacel Industrial Tapes, including heat-sealing and pressure-sensitive tapes, speed production and cut costs by masking, stenciling, sealing, identifying, protecting, insulating, packaging, reinforcing. Write for free booklet, "Fact Book on Pressure-Sensitive Adhesive Tapes." It shows how to use Permacel Industrial Tapes in your plant. Dept. FM-12; Industrial Tape Corp., New Brunswick, N.J.

Permacel INDUSTRIAL TAPES
INDUSTRIAL TAPE CORPORATION • NEW BRUNSWICK, N. J.
"PERMACEL" REG. U. S PAT. OFF.

on welded steel base equipped with rubber vibration absorbers. Available with gravity feed gasoline tank or fuel pump. Gasoline consumption—full load 2¼ hr. per gal., partial load 3¼ hr. per gal. Kato Engineering Co., Mankato, Minn.

PORTABLE FLIGHT CONVEYOR

Materials can be transported at inclines up to 45 degrees on portable Model CFL Tote-all flight conveyor. Made in 14- and 20-ft. lengths, it handles bulk material such as coal, dirt, and ashes, as well as



hot castings. The 2-in. flights bolted to steel roller chain, on 1-ft. centers, assure minimum product "roll-back." Power is furnished by either electric motor or gasoline engine, which will handle up to 60 tons per hour of 50-lb. per cu. ft. material. Maximum discharge height of 14-ft. models is 10 feet, of 20-ft. models is 14 feet. Minimum discharge height of both models is 4 feet. Over-all frame width is 13¾ inches, trough width is 10¼ inches. The conveyor is mounted on the Trail-Hoist, a combination trailer and hydraulic lifting device. Material Movement Industries, 310 South Michigan Ave., Chicago 4.

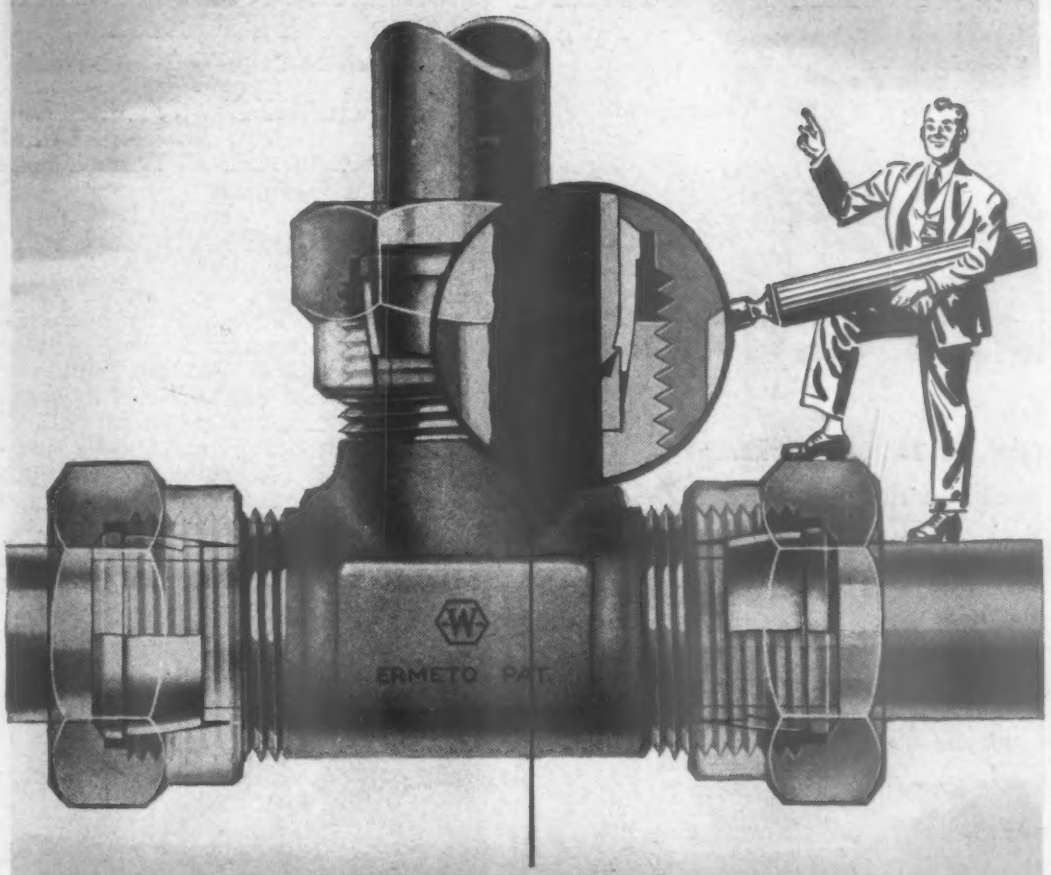
TIP CLEANERS

Wypo stainless steel cleaners, for use in cleaning oxyacetylene welding and cutting tips, are supplied in two different sets. Set No. 1 contains 12 cleaners for drill sizes ranging from No. 75 to 49. Set No. 2 contains 9 cleaners for drill sizes ranging from No. 48 to 30. Air Reduction Sales Co., 60 East 42nd St., New York 17.

SAFETY SPECTACLES

Spectacle-type safety goggle has Ful-Vue acetate frame with a key-hole bridge which is said to be strong and

It'll "stay put" if you use Ermeto fittings



(Sharp edge of sealing ring cold forms a burst-proof seat in tube.)

THEY'RE made in steel, stainless steel and aluminum bar stock and forgings in O. D. Tube Sizes.

Connections are made without flaring, threading, welding or soldering.

Weatherhead Ermeto fittings will hold beyond the burst strength of the tube itself and will withstand excessive vibration without loosening.

These fittings can be reused again and again. They're more easily installed, give performance superior to any other kind of fitting and are cheaper in the long run than any other type fitting because their unique construction permits the use of thinner wall tubing.

Weatherhead Ermeto Fittings are widely used in the Railroad, Marine, Farm Equipment, Road Machinery, Diesel, Petroleum, Oil Refining, Refrigeration, and Machine Tool Fields.

Write today for the new catalog describing the complete line of Ermeto Fittings.

Look Ahead with

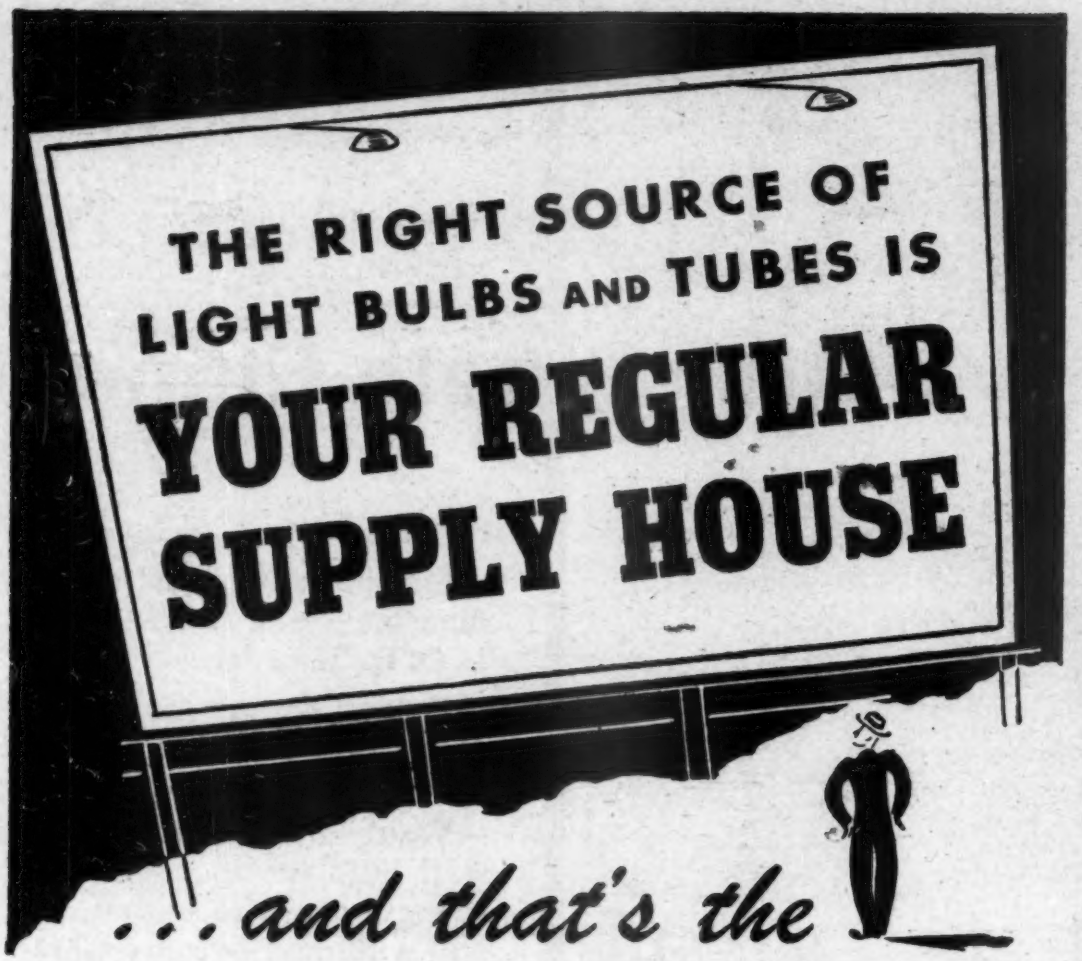
Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO

CLEVELAND • NEW YORK • DETROIT • CHICAGO • LOS ANGELES • HOUMA, LA.

Weatherhead Products Include:

Power Brake Units • Jet Fuel Control Valves • Liquefied Petroleum Gas Regulators • Relief Valves • Flexible Hose Assemblies • Tube Fittings • Refrigeration Valves • Dehydrators



The makers of CHAMPION Fluorescent and *Incandescent* Lamps recommend that you buy electric lamps in the same proved efficient and economical way that you buy other supplies — from the local electrical or industrial distributor who is familiar with your needs, is in constant touch with you, is able to serve you promptly and intelligently.

Champion Lamps are manufactured and distributed to provide high quality, low cost industrial light. The Champion Lamp Works specializes in industrial lamp applications and maintains trained lighting experts in the field to give you reliable, unbiased counsel on the right lamps and lighting for every part of your plant and offices.

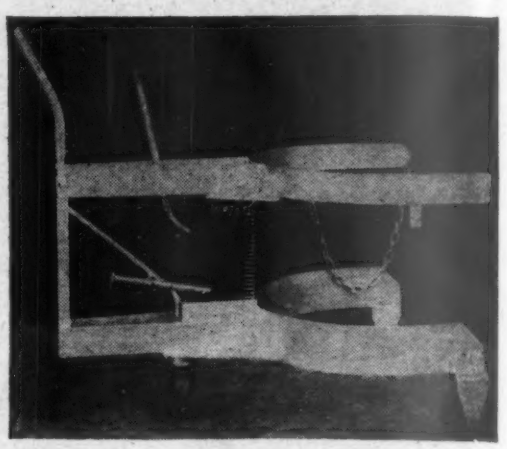
It's to your advantage to standardize on Champion Lamps and get them from your local Champion distributor.

CHAMPION LAMP WORKS
Lynn, Massachusetts
A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO.

sturdy, but lightweight, for ease in wearing. In addition to comfortable cable temples, the F 9200 series goggle is available with skull temples consisting of a wire core encased in acetate. The skull temples are pliable for adjustment. Either 6 Curve Clear or Calobar Super Armorplate lenses may be obtained with the goggles. American Optical Co., Southbridge, Mass.

DRUM TRUCK

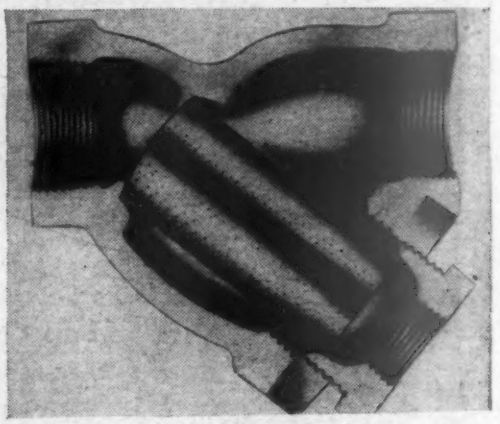
Hydraulic truck, for handling, transporting, and stacking the standard metal drum, is equipped with a 1½-ton automobile-type jack. It includes lift hooks,



and can store drums two or more deep under drum-height shelving. Allied Welding & Mfg. Co., 49 Lorna Doone Blvd., Orlando, Fla.

Y-TYPE STRAINER

Suitable for steam, air, gas, or water, Y-type strainer is claimed to overcome back pressure through the arrangement of interior surfaces, guiding liquids or gases on a course unobstructed by sharp corners or abrupt changes in path of flow. The strainers are cleaned by opening of blow-off cock, which flushes grit and dirt out by line pressure, without shutting off the line or removing strainer



elements. The strainers can be used on working steam pressures up to 250 p.s.i., and temperatures up to 450 deg. F. For use on cold liquid lines or gas lines, the pressure rating is 400 p.s.i. Wright-Austin Co., 315 West Woodbridge St., Detroit 26.

FREIGHT ELEVATORS

Designed for installation in buildings where severe elevator loading exists, standardized line of freight elevators is built to handle powerful, short-coupled, narrow wheelbase trucks. Features claimed are strengthened platform to withstand the heavy concentrated wheel load; side bracing preventing platform

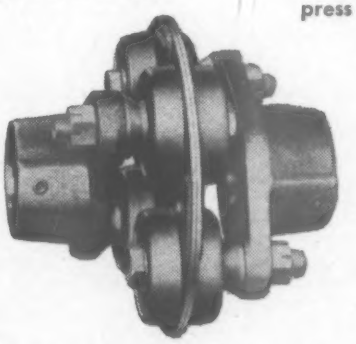
Here are the FACTS on why MORFLEX COUPLINGS have EXTRA softness

This fabric ring, impregnated with moulded Neoprene and forming the outer surface of the biscuit, eliminates abrasion.

This preloaded resilient Neoprene biscuit is designed for uniform stress and linear deflection.

The biscuit core, being a metallic screen, permits impregnated bonding of Neoprene and heavy press fit of bushing.

Assembled under pressure into the special metallic biscuit core, this machined bushing is integral with the entire flexible unit assembly.



Supplied in eleven sizes, Morflex couplings provide an unrivalled range of torsional flexibility from 1.9 to 200 lbs. ft. per degree, with torque capacities varying from 3 to 725 lbs. ft.

This torsionally "soft" coupling uses the exclusive Morse-designed preloaded Neoprene biscuit assembly whose live, muscle-like flexing takes the wrap-up of torsional loads, protects your machine installations from shock, vibration and uneven impulses. Misalignment stresses are minimized and bearing life increased.

A positive, direct drive with no power loss, the Morflex coupling is engineered for tough, dependable service. Its construction eliminates metal-to-metal contact between driving and driven members, requires no lubrication, is sealed against dirt, dust and weather. It will give long life and trouble-free operation to your installation. Consultation with Morse engineers is available without charge—address Coupling Division, Detroit.

MORSE CHAIN COMPANY • Detroit 8, Michigan • Ithaca, New York

MORSE MECHANICAL POWER TRANSMISSION PRODUCTS

A PRODUCT OF B-W BORG-WARNER

Can Frame You!

Now Randolph Gives You ALL FIVE Fire Fighting Essentials

1. EASE—One-hand operation, from bracket to fire. Randolph "4" means panic-proof protection

2. SPEED—Tests prove Randolph trigger-touch "10" stops 2-gallon gasoline fire in 10 seconds

3. SAFETY—Randolph CO^2 will not conduct electricity. And it's non-toxic . . . there's no danger from any poisonous fumes

4. NEATNESS—No mess or stain . . . no water or chemical damage with a new Randolph CO^2 trigger-touch extinguisher

•

Randolph Extinguishers give you a truly great combination of features for full protection against most industrial fire hazards. Guard your property with the right extinguisher . . .

Send today for new free data guide to help you choose proper protection.
Approved by Underwriters' Laboratories.

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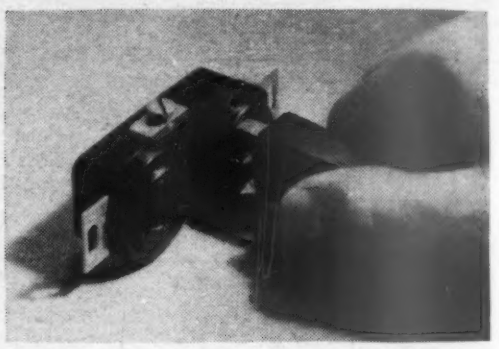
5. EFFICIENCY—Randolph is ready for action under all temperatures. You have no freezing or deterioration to worry about

RANDOLPH
LABORATORIES, INC.
12 E. Kinzie Street Chicago 11, Illinois

from tilting; rigid carframe to offset the effect of eccentric loading; and strengthened rail fastenings and brackets which transmit the guide shoe forces to the building structure. Also, sheave shafts, sheaves, brakes, hoist ropes, and car safeties are checked against the increased weight and the probable truck overload. Automatic leveling prevents truck wheel from dropping off the landing onto the elevator platform. Otis Elevator Co., 260 Eleventh Ave., New York 1.

WALL SOCKETS

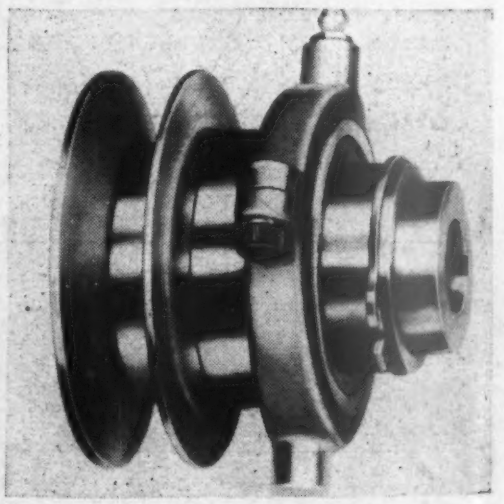
Molded of self-insulating Durez phenolic plastic, wall sockets have pivoted plates which cover the holes when sockets are not in use. This is said to



prevent shock from insertion of metal objects in the holes, or from improper insertion of the plug. When connecting plug, it is turned clockwise 90 degrees, lining up plate holes with holes in socket proper, and plug can then complete contact. Bell Electric Co., 1844 West 21st St., Chicago.

V-BELT CLUTCH

Designed to grip or release directly on V-belts, the "Ball-lok" friction drive clutch units may be used either as



WHY YOU CAN "CLEAN UP" FASTEST...

by

BLANCHARD

grinding:

PER-PIECE MILLING time: 12 min.

PER-PIECE BLANCHARD time: 3.6 min.

THE JOB... Cast iron work chain idler brackets—ground from rough casting to a commercial finish. Size of pieces: 16¾" x 6¾" x 4⅝"

These intricate pieces are held securely by simple support blocks on the 36-inch magnetic chuck of a No. 18 Blanchard Surface Grinder. Putting these pieces on the Blanchard eliminates the need for a special holding fixture. Thirteen pieces are placed on the chuck at each loading.

BLANCHARD GRINDING THESE PARTS REDUCED THE PER-PIECE MACHINING TIME TO 3/10 OF THAT NECESSARY WHEN A MILLER WAS USED

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

It will pay you to ask yourself—and us—on old and new work: "Can we put it on a Blanchard?"

Whether your grinding requires hogging cuts or light finish cuts, fine finish and/or extreme accuracy, avail yourself of Blanchard *Free Consultation Service*. Another Blanchard Service is *Sample Grinding* on which you pay only the transportation charge.

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The BLANCHARD MACHINE COMPANY

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One Reason Why

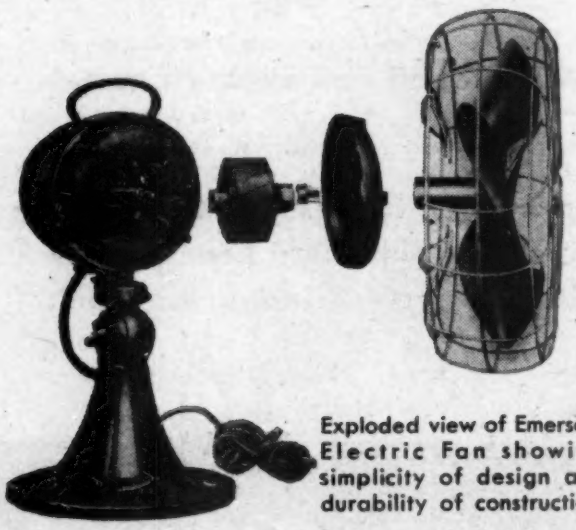
EMERSON-ELECTRIC FANS
Give You Years of Trouble-Free Service

Emerson-Electric 12″ and 16″ A. C. Oscillators have an oil-tight, dust-proof, "sealed" bearing. The rotor revolves on a sturdy, stationary, "built-in", hollow-steel, case-hardened shaft. This has been an exclusive feature of Emerson-Electric Fans for more than 45 years.

Engineered by one of America's pioneer fan manufacturers, these sturdy breeze makers are backed by a 5-year Factory-to-User Guarantee, and built to give you quiet, dependable, trouble-free service.

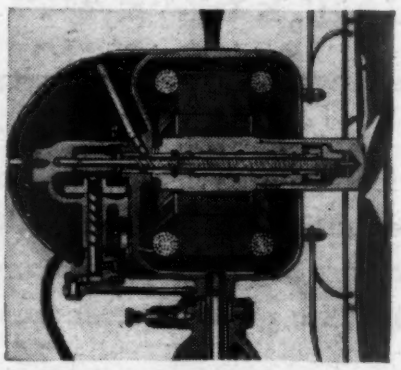
Wherever there's air to be moved, there's an Emerson-Electric Fan to do the job. See your Emerson-Electric Dealer today — or write for Folder No. 423.

THE EMERSON ELECTRIC MANUFACTURING CO.
St. Louis 21, Mo.

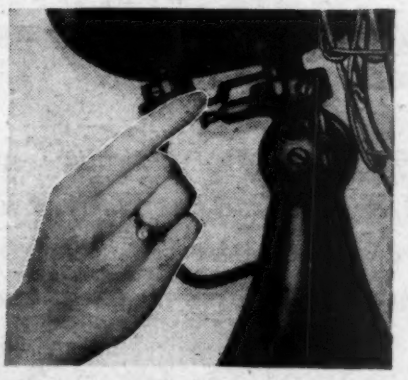


Exploded view of Emerson-Electric Fan showing simplicity of design and durability of construction.

Case-hardened, hollow-steel shaft, on which the rotor revolves, is securely anchored in the motor frame.



Spiral oil grooves in the rotor core and the spiral oil conveyor attached to the floating worm shaft keep the oil circulating continuously, providing "forced feed" lubrication.



Finger-tip oscillation adjusting case. Simply turn the rim of the adjusting case to the desired range of oscillation, from 90° down to stationary position.

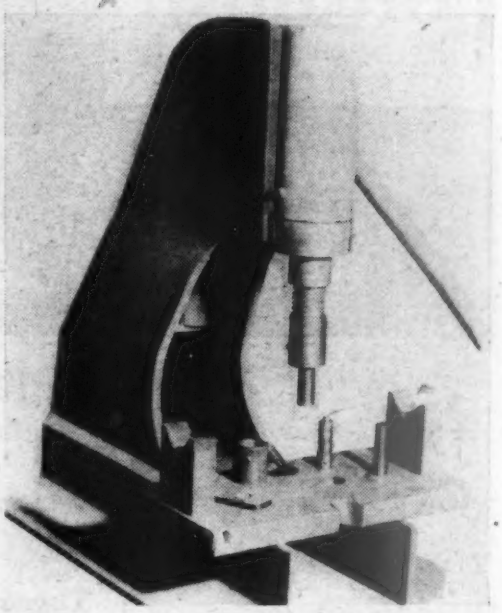
33

EMERSON ELECTRIC
MOTORS · FANS — APPLIANCES

driving or driven pulleys. One fixed flange of the V-belt sheave is an integrally attached part of the hub and the inner race of the sealed ball bearing belt idler. Four free-rolling steel balls ride in grooves in the hub and carry all turning and locking forces. The clutches are suitable for use with internal combustion engines, motors, tractors, and other machines. Four sizes have sheave diameters of 3¼ to 5 inches and are 2 15/16 to 3$\frac{1}{16}$ inches long over-all. Two may be applied to ¾-in. shafts, two to 1-in. shafts. V-Belt Clutch Co., 3757 Wilshire Blvd., Los Angeles 5.

HYDRAULIC ARBOR PRESS

Portable arbor press utilizes hydraulic power to operate the ram. Weighing 100 pounds, it can be moved from place to place by one man, and set up on table or workbench convenient to the job. Length of stroke of operating lever is adjustable to suit the work. Pressure release valve is located beside pump



operating lever. Stroke of ram is 6⅝ inches, and height of ram can be adjusted by rotating lower part to right or left, providing 6-in. adjustment. An automatic relief valve is built in the hydraulic system, to bypass the oil when maximum press capacity is reached. Ruger Equipment Co., Inc., 408 Leader Bldg., Cleveland 14.

AIR CIRCULATOR

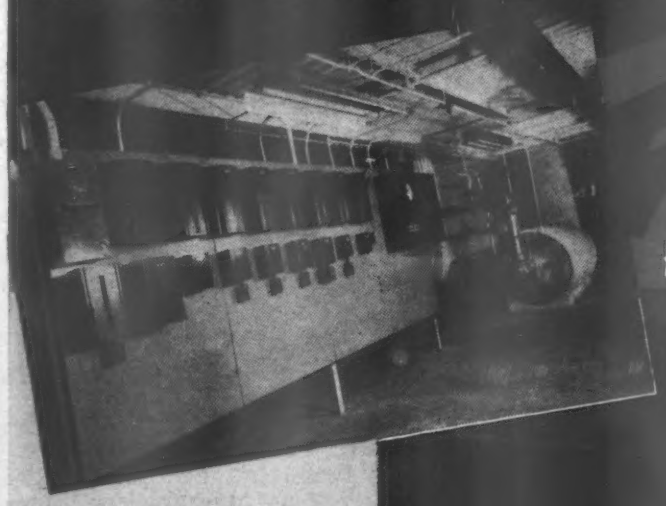
Air circulating and room conditioning unit may be placed in a window for use as an exhaust fan, or located anywhere in a room for cooling purposes. The unit is sturdy, light in weight, and powered by a fractional horsepower, 110-volt, 60-cycle a.c. motor. Includes on-off switch. Cir-Q-Laire Co., Inc., 60 East 42nd St., New York 17.

SHOP FURNACE

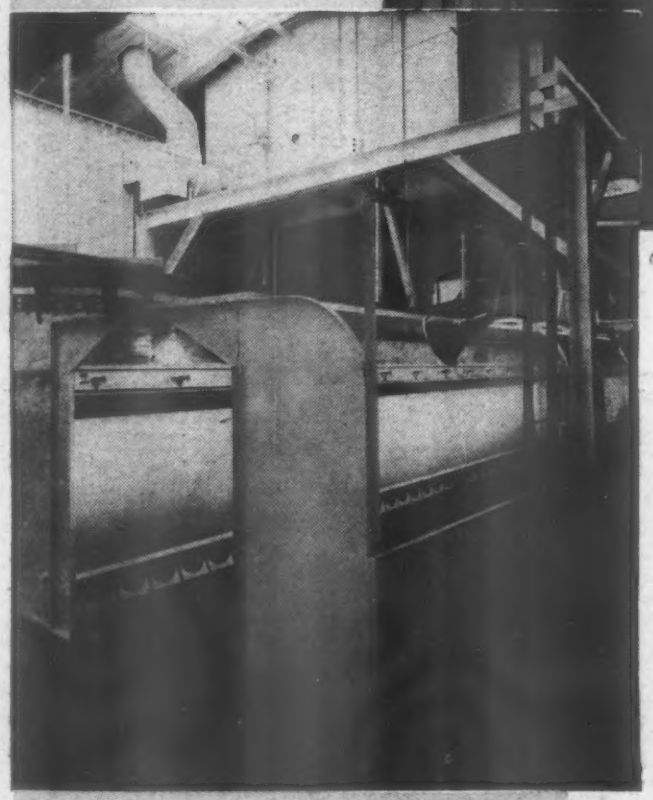
Redesigned automatic shop furnace, made of fabricated steel, is fully enclosed, protecting all working parts against dust and damage, and eliminating accidental contact with the machinery. The centrifugal blower is driven by a direct-connected motor—no transmission is required. A mixer automatically regulates the proportion of gas and air. Control dial is located conveniently at front of furnace. The

COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT



Above: Electrical Control Panel, and Automatic Temperature and Safety Controls for the Entire Mahon Finishing System installed at All-Steel Equipment, Inc., Aurora, Ill. At Right: General view of the same System Showing Interior of Spray Room, Filtered Air Supply, Hydro-Filter Spray Booths, and Drying Oven at Right. Three Stage Washer and Dry-Off Oven are Located just Outside Spray Room at the Left.



Mahon Hydro-Filter Spray Booths in the same installation. The Fan and Filter Room is shown above the Spray Booths with the Drying Oven in the Background. Clean Filtered Air is Supplied and Maintained at Slight Pressure inside this enclosed Spray Room. The Air Supply Diffusers may be seen in the upper right hand corner of the Photograph.

Here is Another Excellent Example of Mahon Planning, Mahon Engineering

For a new ultramodern plant at All-Steel Equipment, Inc., Aurora, Ill., the Complete Finishing System illustrated here was planned, engineered, built and installed by Mahon for finishing the numerous steel products produced by the Corporation . . . it is modern in every detail—utilizing a minimum of floor space. A second, and larger, Mahon Finishing System was under construction in the same plant when these photographs were taken . . . ample testimony to the confidence with which manufacturers turn to the Mahon organization for the finest in Finishing Equipment. If you are contemplating new Finishing Equipment in the near future, call in Mahon engineers now—27 years of pioneering and research in this highly specialized field have endowed them with a wealth of technical knowledge and practical know-how not available to you elsewhere.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 11, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems including: Metal Cleaning Machines, Rust-Proofing Machines, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Units, and Drying and Baking Ovens. Also Paint Reclaiming Units, Hydro-Foam Dust Collectors, and many other Units of Production Equipment.

SEE Mahon Insert in SWEET'S Mech. Ind. File.

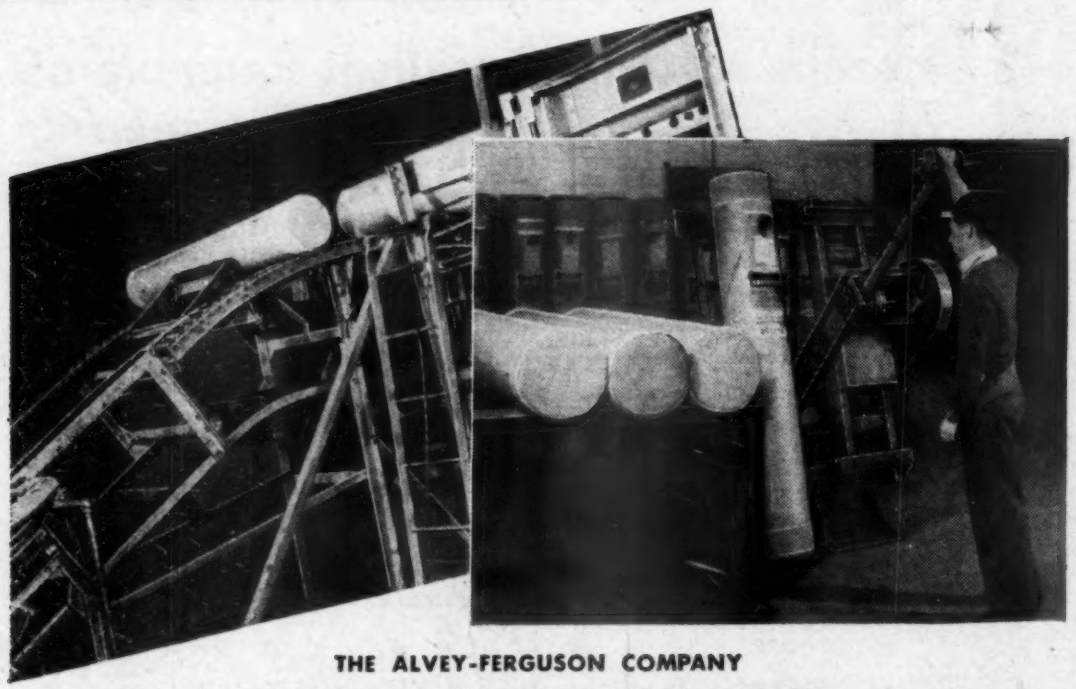
MAHON

HERE is part of an A-F *Engineered,* completely co-ordinated conveying system that is helping to increase production—reduce handling costs in one of the largest linoleum manufacturing plants in America.

An A-F Trolly Conveyor, with special carriers for handling rolled linoleum, travels in ramp between buildings. To save space, the chain returns directly above carrying run.

Special A-F lowering conveyors automatically lower rolls of linoleum from a gravity conveyor to storage areas. At end of line, Upenders place rolls of linoleum in vertical position for storage, after they have been discharged from an A-F Conveyor Table.

YOUR PLANT'S materials-handling and products-handling problems are undoubtedly vastly different from these. But whether you need simple A-F Port-A-Flow Portable Conveyors or an A-F Engineered Completely Co-ordinated System, we can increase your plant's efficiency. Why be satisfied with less? Write, for a discussion, today!



THE ALVEY-FERGUSON COMPANY

137 Disney St. *Established 1901* Cincinnati 9, Ohio

Offices in Principal Cities Coast-to-Coast — Export Department: Cable Address "Conveyor"

CONVEYING EQUIPMENT

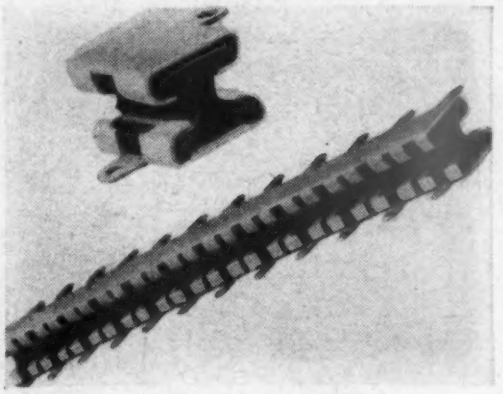
Alvey-Ferguson

METAL PRODUCTS CLEANING EQUIPMENT

furnace can be used for hardening punches, dies, and small tools. Built for intermittent use, but can be operated continuously under favorable conditions. Eclipse Fuel Engineering Co., 733 South Main St., Rockford, Ill.

VIBRATION MOUNT

Light-duty vibration mount isolates vibration in electronic and electrical equipment. Handles deadweight loads as low as ½ pound per lineal inch of mounting strip. The mount utilizes the vibration damping properties of "rubber-in-shear" without overloading of the shear elements, because of "X" design of rubber element which acts in



shear at the points of the "X" under normal loading, but in compression when load exceeds rated capacity of the mount. Furnished in strips 12 inches long, which may be cut into any length section in inch multiples, depending on load. Drilled mounting lugs can be positioned to fit almost any type mounting. Hamilton Kent Mfg. Co., Kent, Ohio.

ELECTRIC MOTOR

In electric motor designated as Axial Air-Gap, the magnetic lines of force follow a path parallel to the shaft (or axis of rotation), as compared to a radial path taken by the magnetic flux in the conventional motor. Motors ranging in size from ⅓ to 10 horsepower are suitable for horizontal or vertical flange

- Applies and removes nuts
- Drills
- Reams
- Taps
- Drives and removes screws
- Drives and removes studs
- Extracts broken cap screws and studs
- Runs wire brushes
- Does hole saw work
- Drills brick and masonry
- Drives wood augers

Uses standard attachments

Powered with special, reversible universal electric motor... plug into any wall socket... no torque reaction to the operator... takes the drudgery out of a multitude of maintenance and production jobs*... see our nearest branch office or distributor.

Ingersoll-Rand

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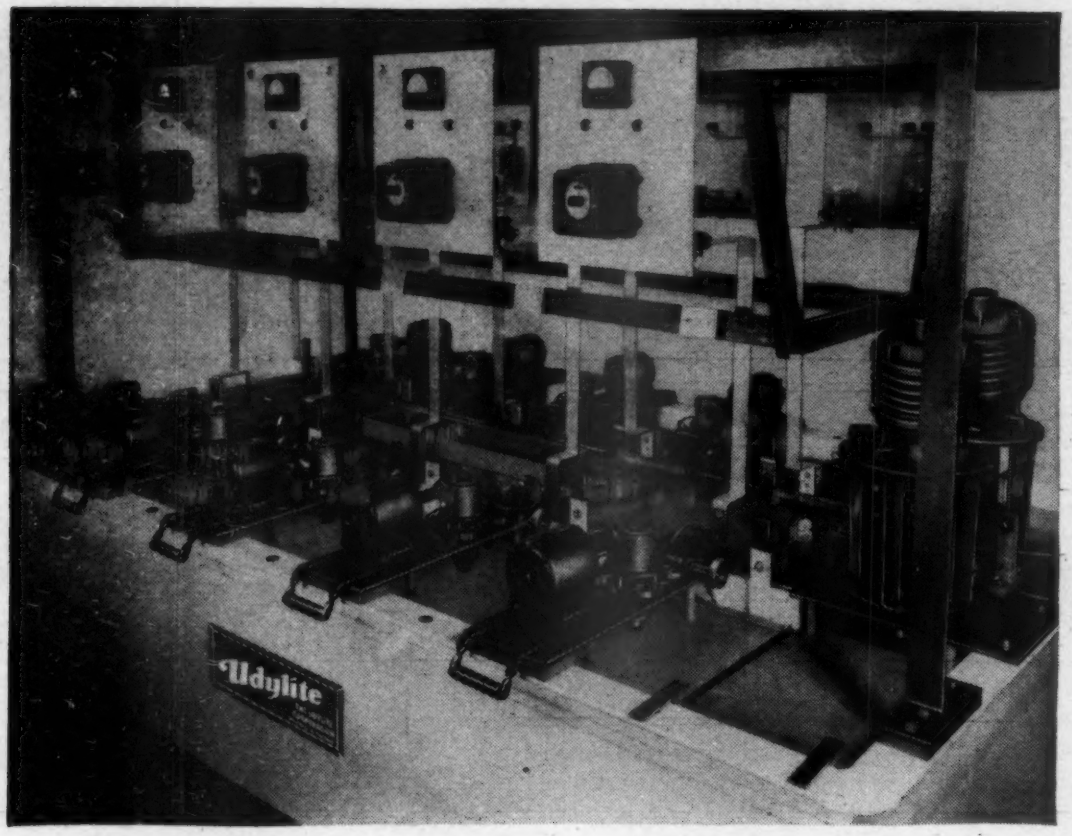

ELECTROPLATING
contributes to the
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Recording of symphonies and other musical compositions for the phonograph has connected the immortal work of Beethoven and Udylite Engineering.

From the original costly wax recording to the multiplicity of record stampers, electroplating performs each of the five steps of duplication. By no other process can extremely fine details be reproduced so accurately. Each step has always required many hours of plating time to secure high fidelity reproducing qualities.

With almost two years of continuous research and experimentation, Udylite produced the plating machine illustrated —the result of a perfect combination of specialized electrical, mechanical and chemical engineering. This machine has not only cut the plating time 80 percent, but produces a better product of greater fidelity. Again, with Udylite the promise is fulfilled.

THE Udylite CORPORATION

1651 EAST GRAND BOULEVARD
DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

mounting, or on an angle base for belt drive. Features space and weight reduction, the motor being less than half the size of manufacturer's conventional type motor, as illustrated, and weighing less by approximately 30 per cent, but retaining all the necessary sturdiness and power requirements. Includes a cooler rotor, and as a flange-mounted motor has less overhang for unlimited machine application. Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago.

INDUCTION HEATER

A 750-watt, 450,000-cycle Toccotron bench-type induction heating machine designed for silver brazing and soldering, is also adaptable to hardening, annealing, and forging applications in its

power capacity. Of the tube oscillator type, it operates from a 110/120-volt a.c. single-phase 60-cycle current source, and is tapped to accommodate either single- or multiple-turn inductor coils. Requires no water connections. Suitable for both automatic or manual operation, it works continually at full load for mass production, and is adaptable to quick set-up changes. Tocco Div., The Ohio Crankshaft Co., 3800 Harvard Ave., Cleveland.

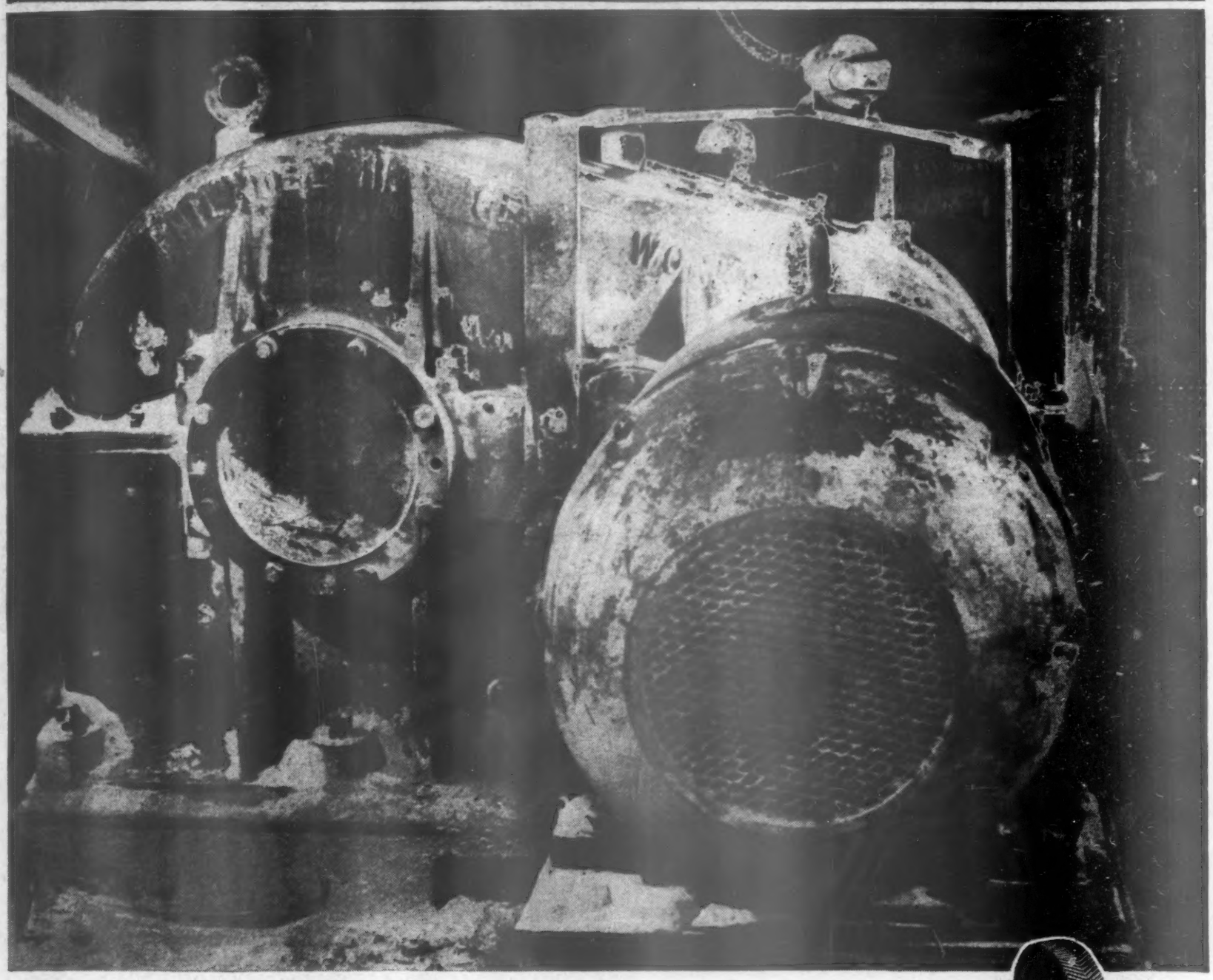
ELECTRIC HEATER

Consisting of metals (type used depending on electrical characteristics desired) completely embedded in Pyrex or silica glass, heater provides output equivalent to 125 watts per square inch in water. The temperature of the wire is held down as long as the heat is carried away as fast as it is produced. Heavy metal coatings may be applied to the units, which can also be inserted in metal tubing and the space between filled with lead or some other metal, in order to maintain rate of heat transfer. Where high resistance to heat shock, corrosion, or high temperatures is required, silica glass units may be used. The units are built for 600 watts at 120 volts, and 1200 watts at 240 volts. Other types are available. Thermolettor Prods., 95 Broad St., New York 4.

MASTER SWITCH

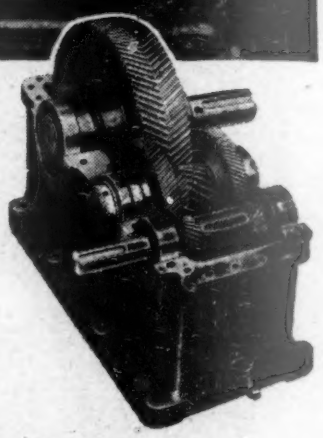
Sturdy construction of mill-type master switch minimizes maintenance. Features include 48-deg. travel from first point forward to first point reverse master switch handle position, and 24-deg. travel from "off" to first point in both directions. Offset handle construction is available for grouping three or four

THIS PHILADELPHIA HERRINGBONE REDUCER *really takes a "TERRIFIC BEATING"...*



The unit shown above is a Philadelphia Double Reduction Herringbone Speed Reducer, driving a 36" drag conveyor on a lime kiln discharge . . . reduction ratio 53 to 1. It operates almost continuously under severe conditions of heavy loads, dust, abrasion and dirt, . . . yet is always on the job, and has been for many years.

Philadelphia Herringbone Units are used by thousands, and are available in Single, Double and Triple types. Send for Catalog No. H-39, and please use your Business Letterhead when requesting same.



Philadelphia
GEAR WORKS INCORPORATED
ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
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Industrial Gears and Speed Reducers
LimiTorque Valve Controls

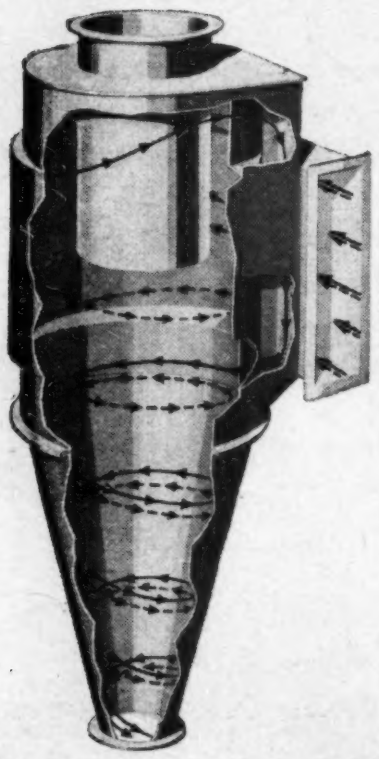
IN DUST RECOVERY . . .

Performance "paved with good intentions" *isn't enough!*

Buell is the champion of Fractional Efficiency Performance Guarantees as the only way to assure the user's after satisfaction.

Dust, inevitably, is a mixture of coarse particles, fine, still finer, and so on down to low-micron sizes. Almost as inevitably, there will be a critically important fraction of certain fines. You HAVE to know that they will be effectively trapped in your dust control apparatus.

Buell tells you in detail! And nothing less than complete Fractional Efficiency Curves present a true picture.



Buell performance is in a class apart because of its design. The patented van Tongeren harnessing of the otherwise mischievous "double eddy" current is at the heart of the matter. The Shave-off is the pay-off!

What it is and why it makes so vital a difference is the subject of an interesting exposition in "The van Tongeren System of Industrial Dust Recovery". Free for the asking. Write: Buell Engineering Company, 12 Cedar Street, New York 5, N. Y.

buell

Engineered Efficiency in DUST RECOVERY

units with 7-in. handle centers. Switch has hardened cam shaft with needle bearings. Bakelite cams are bolted in position. Complete assembly has wide electrical clearances, and can be removed as a unit. Incorporates hardened star wheel and roller. Return spring pressure is adjustable. The dust-tight enclosure is split at bearing line, has shallow box, deep cover, and ample space for internal wiring. Square D. Co., 4041 North Richards St., Milwaukee 12.

RADIAL WOODWORKER

Radial arm woodworking machine incorporates arm, column, and base of one-piece aluminum construction. Controls are conveniently located in front of the machine. Automatic position-finders are self-compensating for wear. Called Raydol Woodworker, the unit has totally

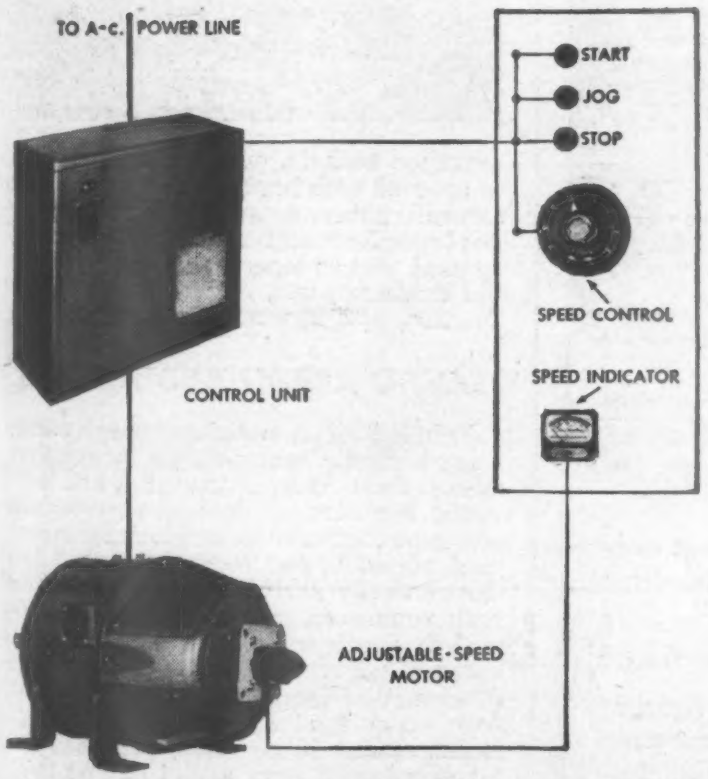
enclosed fan-cooled motors of 1 or 2 horsepower, and a simple selector switch which permits use on either 115- or 230-volt current. Long and short arm operation eliminates need for removing guide strip; because the arm can be moved forward to increase rip and cut-off capacity. Cotton Engineering Corp., Bartlett, Ill.

SMALL SPOTLIGHT

Small self-contained Opti-Spot spotlight contains a focusing condenser lens which permits adjusting size of the spot. The lamp is replaceable automotive type. The beam is strong enough to allow use of the lamp up to 6 feet from the work. Heat is negligible, preventing work distortion. A 110-volt 50-60-cycle a.c. transformer supplies a 6-volt output to the filament of a standard base, two-contact lamp. Model A uses a 16-in. flexible tubing connection between lamp and

RELIANCE V★S DRIVE

Greater PRODUCTION with V★S DRIVE ALL-ELECTRIC CONTROL...from A-c. Circuits



Conveniently-packaged, space-saving V★S Drives are available from 1 to 200 hp.

Actually, Reliance V★S Drive is an *electric transmission.* At the touch of a button your machine can be started or stopped. Turn the knob of a rheostat and it can be accelerated or decelerated smoothly—over an infinite range of stepless speed changes. And with this *All-electric, Adjustable-speed Drive operating from A-c. Circuits,* control can be either automatic or manual . . . at the machine or from remote stations. The net result of V★S control is greater efficiency, faster production, lower costs—as already proved in every industry. That's why it will pay you to write today for Bulletin 311.

RELIANCE ELECTRIC & ENGINEERING CO.
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RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

"... and this, gentlemen, was when we installed the General Electric Water Coolers."

For new altitude records in employee morale, install General Electric Water Coolers. Refreshing, convenient, and so economical. See your General Electric Dealer today. *General Electric Co., Air Conditioning Dept., Section 7727, Bloomfield, N. J.*

GENERAL ELECTRIC

Water Coolers

SPEED

Making up Payrolls with **SIMPLEX TIME RECORDERS**

EXPLORE THE POSSIBILITIES

Explore the possibilities of "Simplex" as an invaluable means of improving employer-employee relations. Mail coupon TODAY.

Time savings all along the line are advantages realized in plants where Simplex Trigger-Touch Time Recorders are on the job. For example:

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SIMPLEX TIME RECORDER CO.,
Watkins Blvd., Gardner, Mass.

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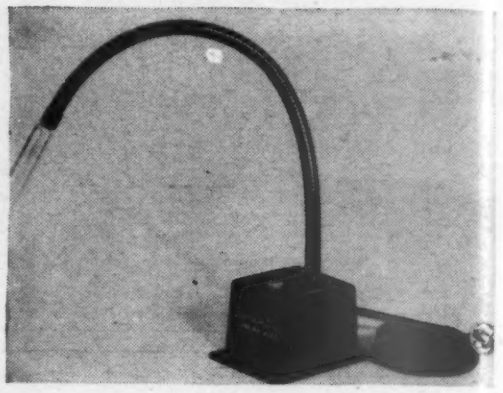
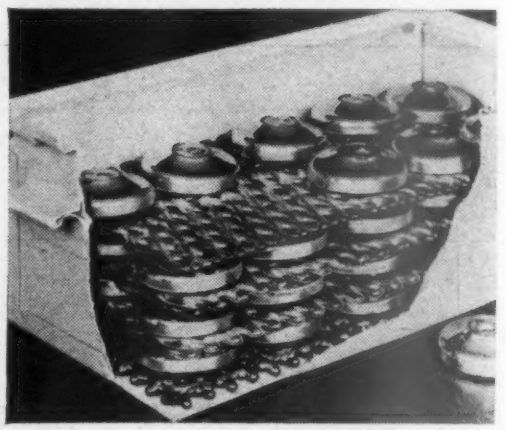


base which maintains adjustment of lamp position, and Model B has an 18-in. rubber-covered cord between lamp and base. Both are equipped with "on-off" switch, and 5-ft. extension cord connecting transformer to power outlet. Benton Co., 351 South LaBrea Ave., Los Angeles 36.

MATERIAL SEPARATORS

Rubber-covered woven wire screen and expanded or perforated metal mesh are designed to separate and protect parts that have been plated, painted, or precision finished. The mesh separators permit drainage. Separators of any size can be furnished to fit bottoms of totepans,



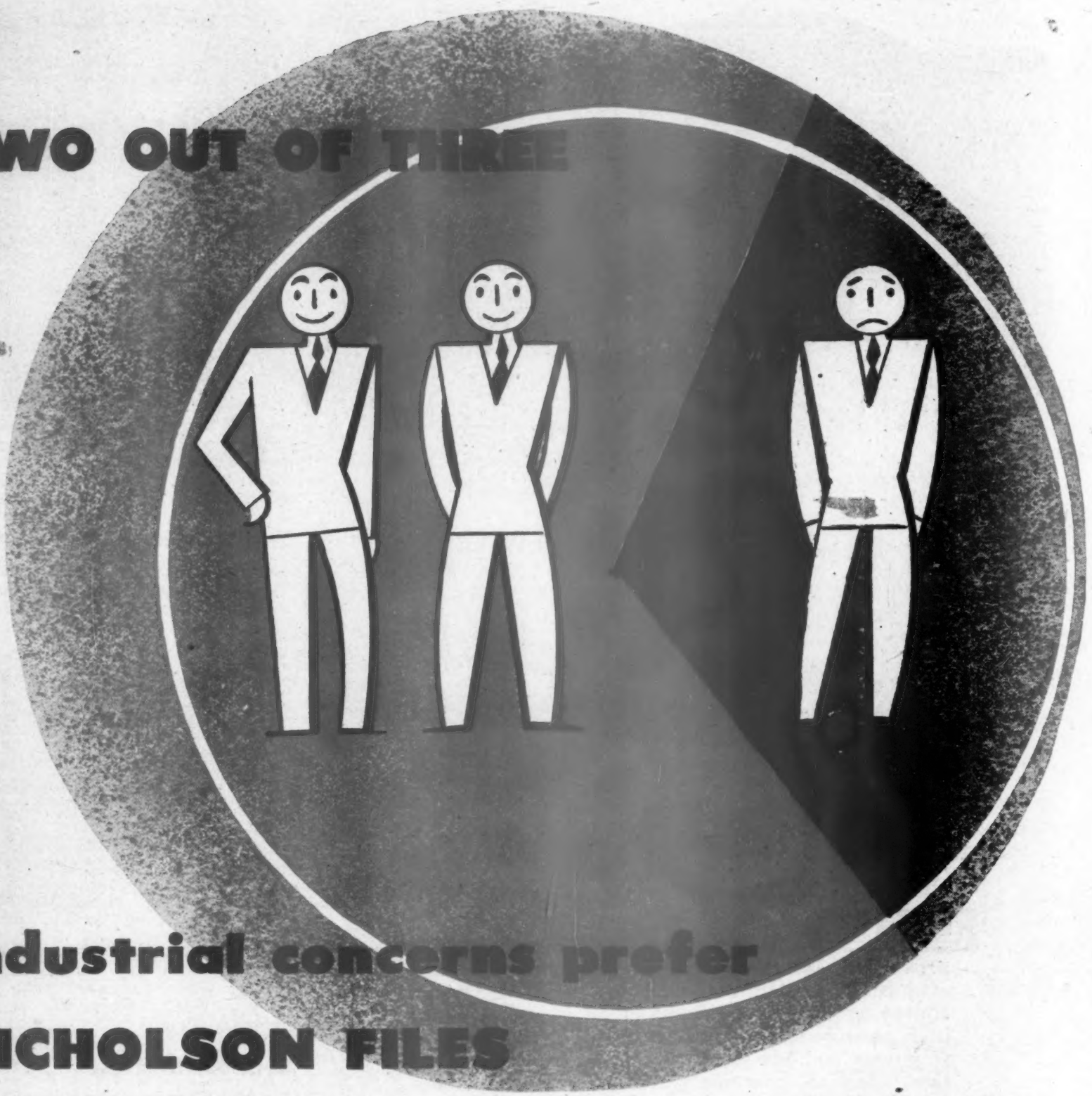
conveyor baskets, or pallets. They can be covered with hard, semi-hard, or soft natural rubber, or synthetic rubber, to meet specific conditions. The screens can be used also as separators in palletizing and stacking parts. Automotive Rubber Co., Inc., 8631 Epworth Blvd., Detroit 4.

PLASTIC APRON AND SLEEVES

Fabricated of a multi-purpose, clear, frosted plastic material, for protection against most acids, caustic, oils, and solvents, Nitroflex apron and sleeves are said to be comfortable, and to resist snagging, abrasion, and wear. All seams are electronically sealed. Aprons are fitted with reinforced grommets and include slightly elastic tubular laces of the same material. Sleeves are 14 inches long, and fitted with adjustable elastic bands at both ends. Aprons are made in light, medium, and heavy weights. May be furnished with drip pocket having four snap buttons which allow pocket to be opened up flat for cleaning. Industrial Products Co., 2820 North 4th St., Philadelphia 33.

STEEL HAND TRUCKS

Addition to line of Rollatruck steel hand trucks has curved crossbars to facilitate handling drums, barrels, or kegs. Truck is of all welded construction, and has rubber-tired wheels Ranging from



Industrial concerns prefer NICHOLSON FILES

NICHOLSON file brands enjoy a wide margin of user preference. This fact is indicated by the millions of files the Nicholson factories turn out annually. It is supported by the many industrial distributors' customer accounts which include these famous brands as items. It is substantiated by specific surveys conducted by impartial agencies. . . . They show Nicholson brands leading the field by more than *two to one*.

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NICHOLSON FILES FOR EVERY PURPOSE

Titeflex All-Metal Flexible Tubing has been proved by 30 years of service tests on industry's toughest jobs. It has been used with outstanding success for conveying liquids and gases of all types, including high pressure steam, hot oils, tar and asphalt, and refrigerants and has stood up under heat, cold, corrosion, abrasion, constant vibration and other abuse. Applications like these have been the proving ground of TITEFLEX flexible metal hose

Titeflex All-Metal Flexible Tubing is designed and constructed for greater METAL strength, flexibility, safety, permanence, protection, adaptability, and resistance to wear. When you specify TITEFLEX, you specify a soundly engineered product that has a proved record of performance on the most difficult applications. TITEFLEX Catalog No. 113, giving the facts on all types of TITEFLEX installations, is available on request.

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Exclusive Manufacturers of Titeflex high quality products for more than 30 years

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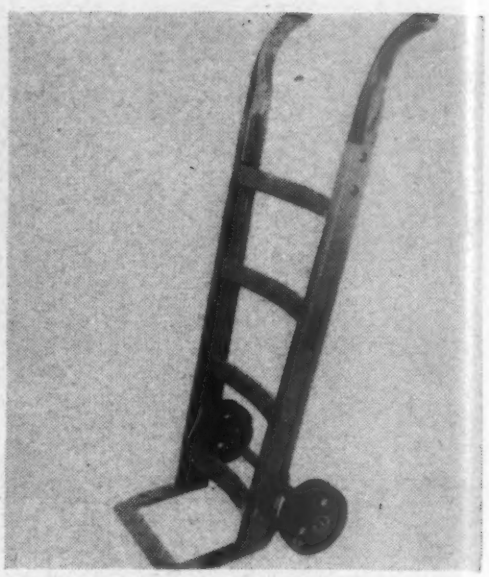


46 to 58 inches, the trucks are available with curved cross members as well as regular straight sections. Kensico Manufacturing Co., Inc., Hubbel's Rd., Mt. Kisco, N. Y.

Y-STRAINER

Made in pipe sizes from ⅛ to 2 inches, Y-type strainer is available in either cadmium plated rust-resisting cast iron or in all bronze construction. Strainers

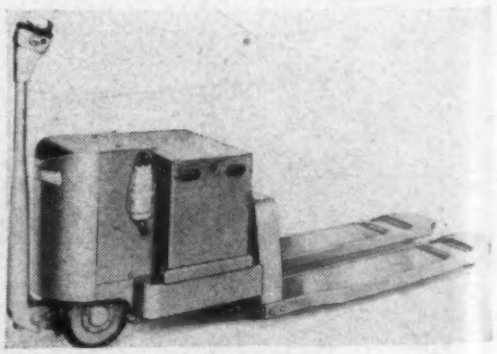
are built around 250-lb. standards for cast iron, and are suitable for 400-lb. service when furnished with bronze body. A. W. Cash Valve Mfg. Corp., Decatur 60, Ill.

CHANGE IN NAME

Industrial Instrument Service Co., Long Island City, manufacturers of pyrometer accessories, flow meter seal and condensate chambers, pneumatically operated continuous drainers, and special purpose instruments, announces change in name to Industrol Corporation.

LIFT TRUCKS

Model "K" Hydroelectric motorized lift trucks, made in pallet and platform types in different sizes, have 4000-lb. capacity. Features include two forward speeds and two reverse, dynamic braking, and two-



Replace with RCA IGNITRONS

- **For Welding Control**
- **Power Conversion**
- **Power Rectification**

Directly interchangeable with other standard types

RCA Ignitrons fill major renewal requirements and are directly interchangeable with types commonly used in welding-control units, power conversion equipment, and power rectifiers.

The RCA Ignitrons illustrated are representative of a large and growing family of RCA industrial electron tubes of which there are over 200 *standard* types. Included in this group is a complete line of thyratrons, power amplifiers for high-frequency heating equipment, and an equally complete line of high-vacuum and mercury-vapor rectifiers for low- and high-voltage applications.

RCA industrial electron tubes embody the ruggedness, high quality and long service life which you should expect from tubes designed specifically for continuous duty applications. They can be counted on to deliver outstanding performance.

When you need renewal tubes, look to RCA.

SEND FOR BULLETIN GIVING COMPLETE DATA

Bulletin No. 2F403 covers prices, technical description and interchangeability by type numbers of the complete line of RCA industrial electron tubes. A request on your company letterhead addressed to RCA, Commercial Engineering, Section IR- 12K, Harrison, N. J., will bring your copy.

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IN RADIO AND ELECTRONICS—THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA

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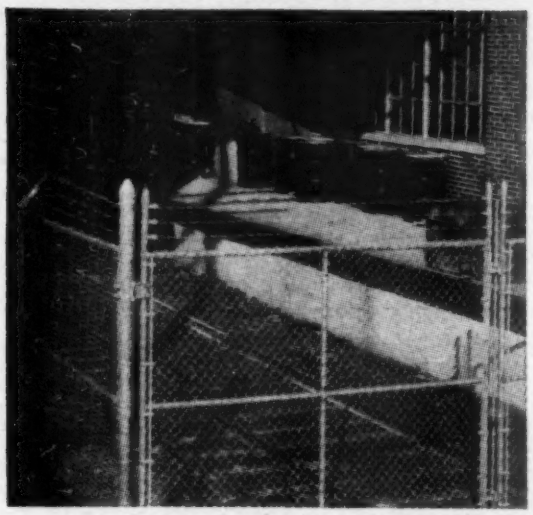
MORE IMPORTANT THAN EVER

THE ONLY CHAIN LINK FENCE MADE OF * KONIK STEEL

KONIK is the registered tradename for the patented steel containing copper, nickel and chromium used in Continental Chain Link fence fabric. KONIK possesses a greater tensile strength and higher elastic limit and is rust-resistant "clear through." All the extra value of this modern steel now comes to you only in Continental Chain Link fence.



ENGINEERED FOR PROTECTION

Continental fence has 14 distinctive construction features including heavier line posts . . . stronger and more easily operated gates . . . improved pivot-type hinges . . . self-locking barb arms . . . and 20% more ties . . . fabric of rust-resistant, full gage wire of KONIK steel with heavy uniform zinc coating. Continental fence combines style with durability and positive protection for your property.

TAILORED TO FIT YOUR PROPERTY

Experienced fence engineers plan and help erect Continental Chain Link fence anywhere. No matter what your property protection problem, Continental fence is designed for your installation, then custom-built for quick erection on the site. Correct and economical construction can be done by trained erection crews. When local labor is to be used, Continental can supply a competent foreman and inspection service. *Write for FREE fence manual.*

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CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

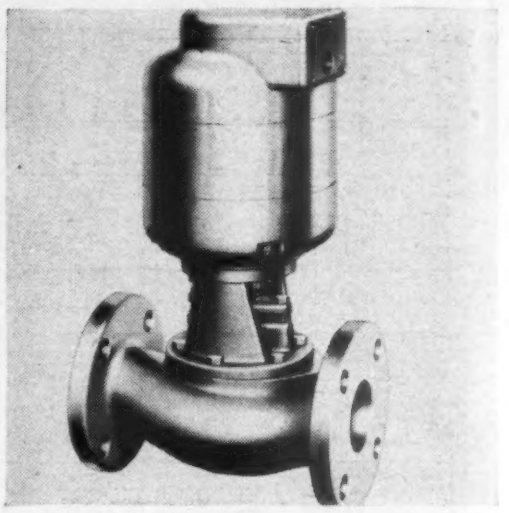
GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF STEEL SHEETS, including Continental GALVANIZED, COPPER-STEEL Galvanized, KONIK steel sheets Galvanized, UNIFORM SPANGLE Galvanized, DULL COAT, Continental GALVANNEALED, ELECTRICAL, Hot Rolled Pickled, and many styles of Formed Roofing. ALSO, Manufacturer's Wire in many sizes, shapes, tempers, and finishes, Continental Chain Link Fence, Nails, and other steel products.

wheel front drive. Truck is designed for complete electrical operation. A compact motor and pump comprise the power lift, and the motor, drive, and controller can be removed from the frame in a unit. Speed control is obtained without use of resistors. All speeds and the brake are controlled by three pushbuttons in steering handle. Trucks can be equipped for 8-, 12-, and 24-hour service with standard batteries. Lift Truck, Inc., 2425 Spring Grove Ave., Cincinnati 14.

PUMP

Constructed for installation on hot water heating systems as a booster unit, Model 1-B pump may be used for other applications as well. The ¼-hp. motor is for standard hot water systems, and the ½-hp. motor is available for extra-heavy-duty service, or where liquids more viscous than water are handled. Direct-connected to the pump, the motor



is a totally enclosed type, equipped with grease packed sealed precision ball bearings. Motor stator is dynamically balanced by dynetric process to close limits, for vibrationless and quiet operation. Built on centrifugal principles, the pump is provided with opposing inlet and outlet for standard (125-lb.) 2-in. pipe flanges. The Ruthman Machinery Co., Cincinnati 2.

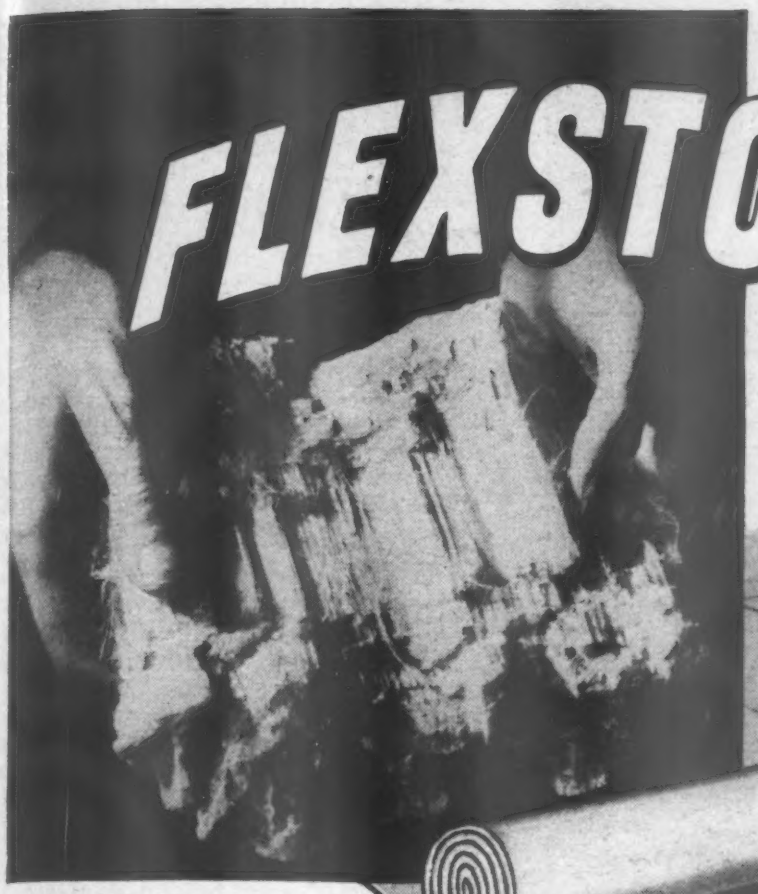
PIPE CLEANER

Electric snake gun, for use with ¼-, 5/16-, ⅜-, and ½-in. steel snakes, permits one man to clean pipe in close quarters or in cramped positions. Features include a gear case packed for the life of the tool, balanced construction, power to turn 100 feet of ½-in. snake, and reversibility. May be applied in any position, and the tool ferrules onto snake house for carrying. Combined with ¼-in. electric drills, the tool is designed to provide work power for most pipe cleaning and boring operations, and for backing out and re-tooling in difficult pipe obstruction cases. Flexible Sewer-Rod Equipment Co., 9059 Venice Blvd., Los Angeles.

PACKLESS VALVE

Pushbutton packless valve has a forged brass body, and is suitable for handling oil, air, water, or any substance not corrosive to brass, in pressures up to 100 pounds. Normally open, it is designed for either manual or automatic instant valve operation, where leakage around packing would be undesirable. Has a renew-

FLEXSTONE BUILT-UP ROOFS



Crude asbestos fibre in its original rocklike state.

Made of ASBESTOS

each ply is a flexible covering of stone

There's the secret of that Rock-of-Gibraltar resistance to wear and weather which you get in Johns-Manville Flexstone Roofs! It's in the *felts.* They're made of the magic mineral *asbestos*—fireproof, rotproof, long-lasting.

Give your buildings that kind of all-out protection.

Flexstone Roofs are *smooth-surfaced*, permitting fast and thorough roof drainage, eliminating the extra weight of slag or gravel, and making it easy to locate and repair any damage. They need no periodic coating. Asbestos felts are perforated to insure smoother and better application.

All Flexstone Built-Up Roofs are engineered to the particular requirements of your building—whether it's new construction or re-roofing. To insure skilled application, they are applied only by J-M Approved Roofers.

Three types are available: Flexstone *Super "A"*, Flexstone *Standard*, and Flexstone *Service*—each the finest that can be specified for its purpose. Write for our brochure BU-51A. Johns-Manville, Box 290, New York 16, N. Y.

Because of unprecedented demand, there may be times when we cannot make immediate delivery. Please anticipate your needs.

Resist drying-out action of the sun

"SCRAPE TEST" proves it!

Wherever you scrape the gray surface of a Johns-Manville Flexstone Roof, you'll find black live asphalt underneath, showing that the felt itself and the waterproofing agent between the plies is effectively protected from the sun by the asbestos fibres within the felts. Result: Flexstone Roofs won't dry out . . . give extra years of service.

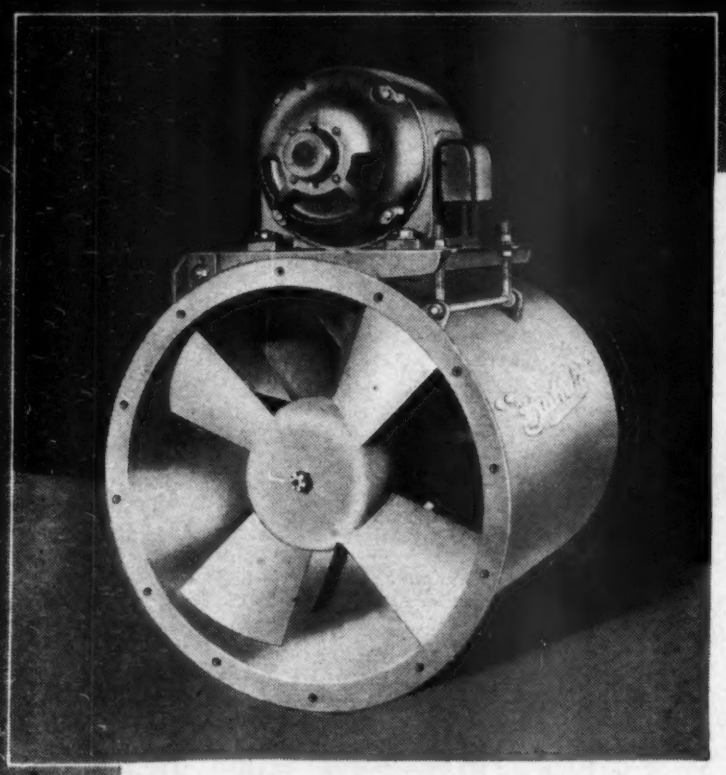
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville FLEXSTONE BUILT-UP ROOFS

freezing

FISH FOWL FRUIT

FAST!



This "Buffalo" Axial Flow Fan, the Vaneaxial belt-driven type, is ideal for quick freezing systems.

Circulating chilled air as a part of the freezing process, "Buffalo" Axial Flow Fans are playing an important role in the fast-paced food industries. Here, where freezing must be done FAST—where timetable schedules must be KEPT—air must be delivered continuously and in plentiful volume! In addition, the cost of operating such fans must be low. "Buffalo" Axial Flow Fans meet these requirements—not only in foods, but in growing numbers of air jobs in many other businesses. Working on the straight-line air principle, they attain remarkably high efficiencies, especially when installed in straight portions of duct systems. Perfect rotor balance assures quiet, vibrationless performance, and the "Buffalo" Limit-Load characteristic prevents motor burnout.

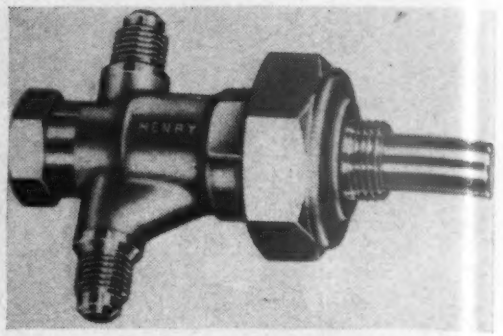
For low-cost, dependable air delivery in comfort, health and process ventilation, write us now for Bulletin 3533-B.

BUFFALO FORGE COMPANY

471 Broadway Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" AXIAL FLOW FANS



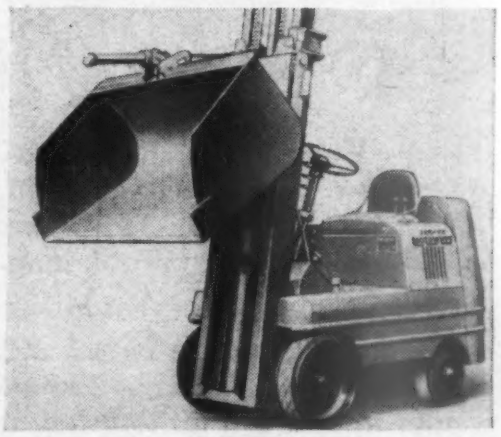
able disk, renewable diaphragm, and a threaded collar around the pushbutton, which permits mounting it through a flush panel opening. Can be furnished with male SAE, IPS, or female solder connections in ¼- to ½-in. sizes. The Henry Valve Co., 3260 West Grand Ave., Chicago 51.

FLUORESCENT LAMP

Fluorescent lamp, called Emeralescent, emits a spectrum which predominates in light output in the most sensitive portion of the human eye sensitivity curve, according to the manufacturer. When viewed under the light all white objects acquire a soft green pastel tint. A considerable saving in current is claimed also. The lamps are available in 20- and 40-watt sizes. Certified Electric Corp., Warren, Pa.

FORK TRUCK ACCESSORY

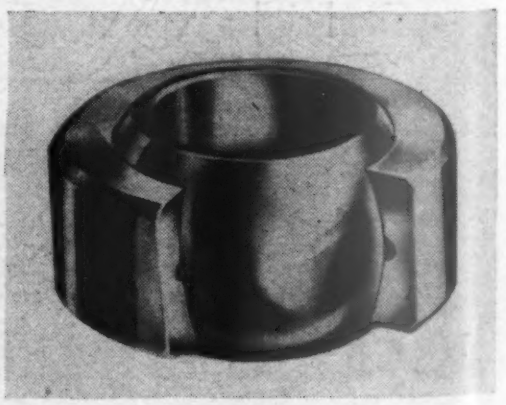
Scoop attachment for Motowlift fork lift truck features an air cushion shock absorber to prevent the scoop from slamming down on the mast. All-steel

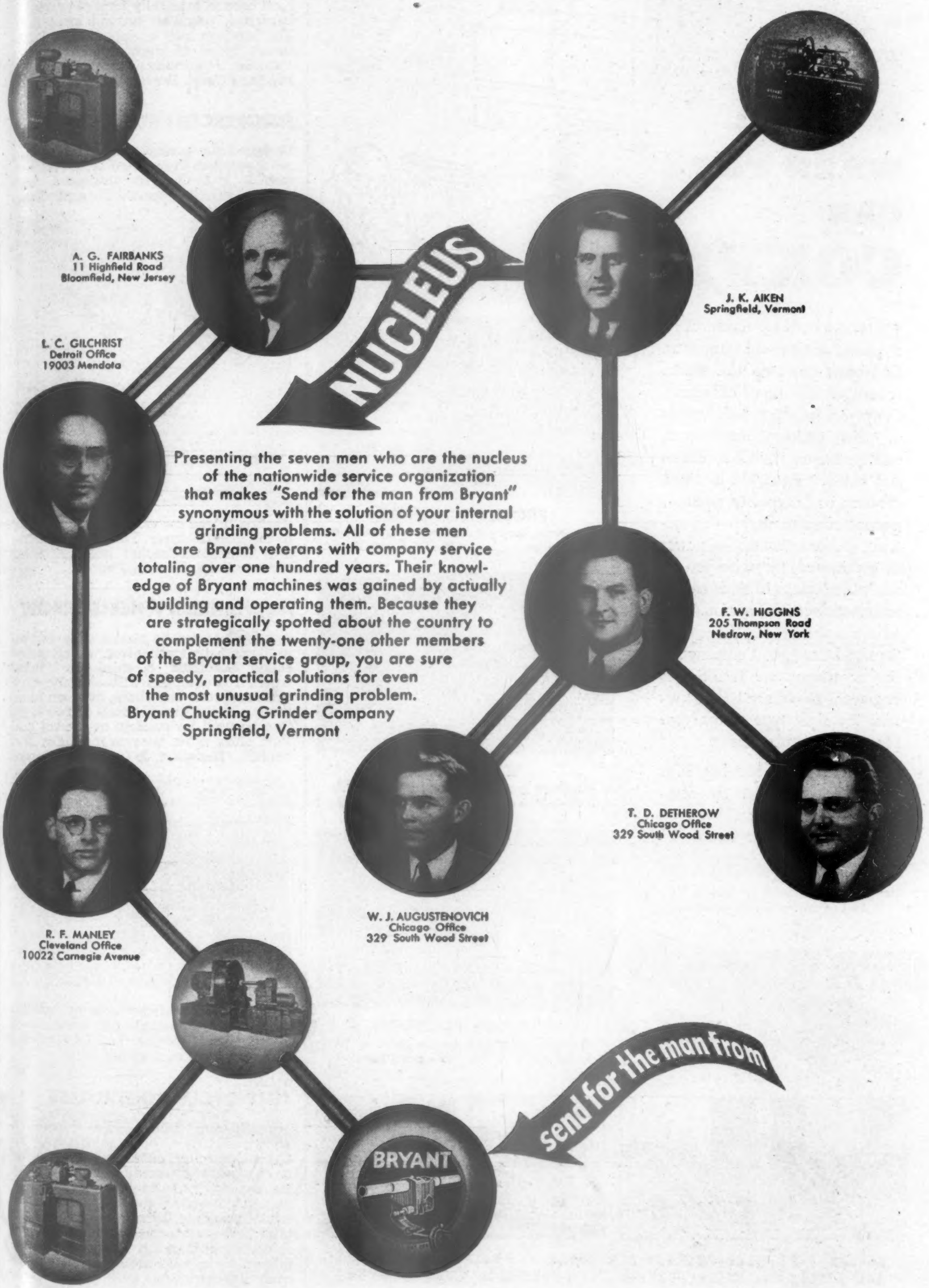


welded, the scoop may be attached to the fork carriage in five minutes. Capacity is 10 to 17 cubic feet. Has a replaceable blade. Service Caster & Truck Corp., Albion, Mich.

SELF-ALIGNING BEARING

Halfco spherical self-aligning bearing is adaptable for use as a rod end bearing, rotation bearing, static and self-aligning

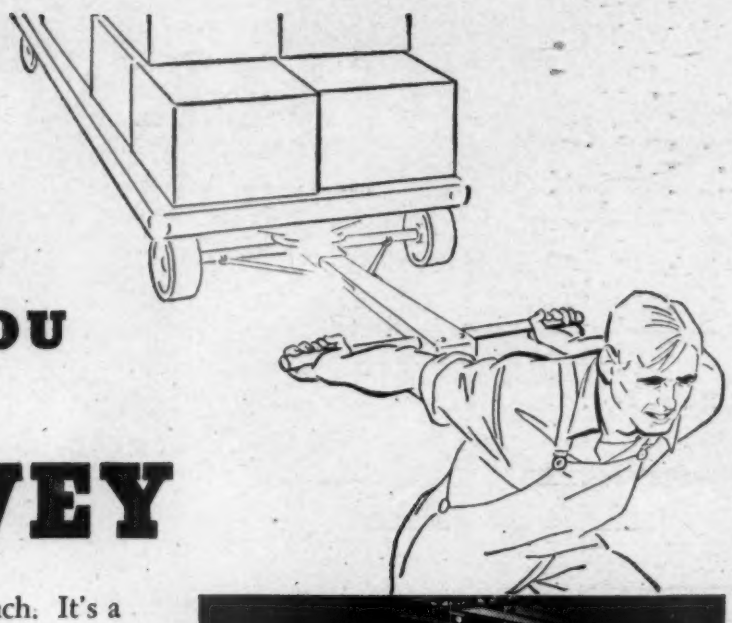




Presenting the seven men who are the nucleus of the nationwide service organization that makes "Send for the man from Bryant" synonymous with the solution of your internal grinding problems. All of these men are Bryant veterans with company service totaling over one hundred years. Their knowledge of Bryant machines was gained by actually building and operating them. Because they are strategically spotted about the country to complement the twenty-one other members of the Bryant service group, you are sure of speedy, practical solutions for even the most unusual grinding problem.

Bryant Chucking Grinder Company
Springfield, Vermont

WHY PULL WHEN YOU CAN CONVEY



PULLING costs too much. It's a waste of time and manpower. Conveyors can stop this waste. Investigate the use of conveyors. Conveyors handle a wide variety of parts, packages, units, cans, bottles, barrels, bundles, drums and boxes. Available in light, medium or heavy-duty types — portable or stationary — as systems, sections or units — power or gravity fed, they give you remarkable savings in time, money and manpower conservation. They relieve confusion and congestion. Standard Conveyor Company has the experience and facilities to engineer, recommend and furnish the right type of conveyor for your particular needs.

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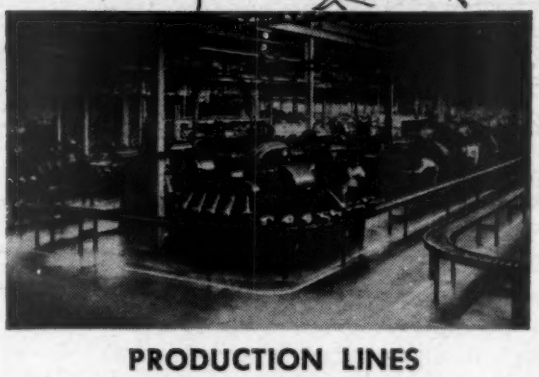
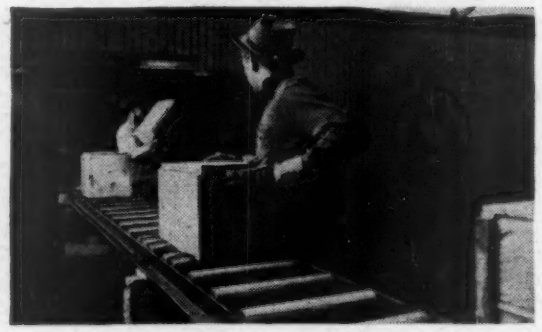
STANDARD Gravity and Power CONVEYORS

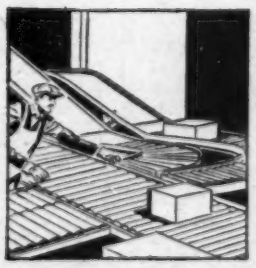


PRODUCTION LINES
Conveyors keep production moving without interruption.

WAREHOUSES
Handibelt portable conveyor helps pile cartons higher and faster in a warehouse.



LOADING PLATFORM
Cases move fast into cars on sectional roller conveyors — with less manual handling.

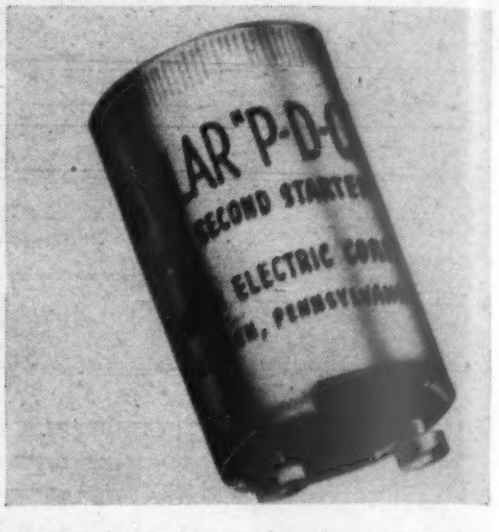


ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

bushes, and similar applications. Consists of two pieces. The outer race is of hard bronze, integrally formed around a hardened, precision ground steel ball. The bearings may be fabricated of different types of metals to meet installation requirements. Adel Precision Products Corp., Burbank, Calif.

FLUORESCENT STARTERS

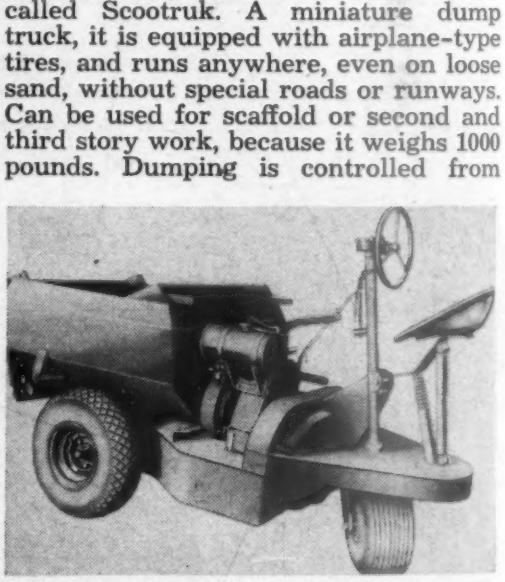
Designed for prompt, dependable, and quick starting, fluorescent lamp starters, named P-D-Q, are pretested and checked in actual service to assure lamp



starting in one second or less, according to the manufacturer. They fit all standard fluorescent socket holders. Solar Electric Corp., Warren, Pa.

MECHANIZED WHEELBARROW

A 1-ton load can be carried at speeds up to 15 m.p.h. by mechanized wheelbarrow called Scootruk. A miniature dump truck, it is equipped with airplane-type tires, and runs anywhere, even on loose sand, without special roads or runways. Can be used for scaffold or second and third story work, because it weighs 1000 pounds. Dumping is controlled from



driver's seat or from side of bucket. Steering is by a single tail wheel, permitting maneuvering in tight places. Novo Engine Co., Lansing, Mich.

TIME CYCLE CONTROLLER

Multiple-cam time cycle controller, known as Model C500 Impulse-Sequence Cycle Controller, automatically actuates or engages, at the set time in each cycle, the necessary mechanical, electrical, or pneumatic devices to carry out the intended schedule. Time measurement and pilot valve operation are handled by separate mechanisms. Timing is accomplished by a Telechrom-driven aluminum disk imprinted with a 25-in. time

and you can Forget about Coupling Shutdowns

Exclusive Metal-to-Metal Seal Gives You *Extra* Protection

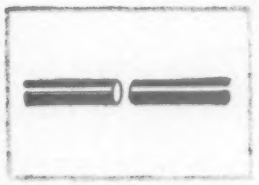
The surest way to stop coupling shutdown worries is to install Fast's Couplings in your plant. For one thing, the *exclusive* "rocking bearing" shown above makes a positive metal-to-metal seal for the load-carrying oil . . . permanently protecting it against wear-producing moisture, dust and grit. No perishable packing rings are used. There's nothing to wear, nothing to fail. The coupling is all-steel throughout—without a single perishable part.

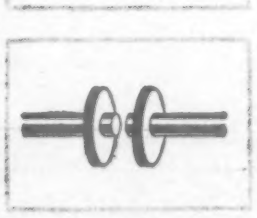
Remember: Fast's self-aligning Couplings are the *original* gear-type couplings. Years of design and manufacturing experience go into every one . . . to give you uninterrupted power transmission . . . to lengthen machine life, lower upkeep costs, minimize shutdown losses.

We have a full complete line of couplings for immediate delivery. Get full details on Fast's Couplings now. Write today for your free copy of our complete catalog. Address: Koppers Company, Inc., Fast's Coupling Dept., 297 Scott Street, Baltimore 3, Md.

KOPPERS

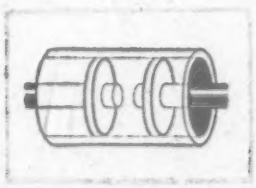
FAST'S *self-aligning* COUPLINGS

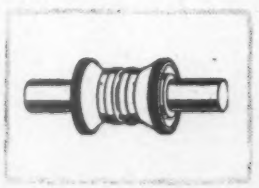


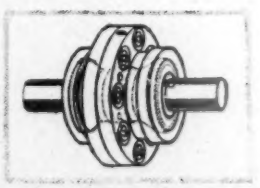


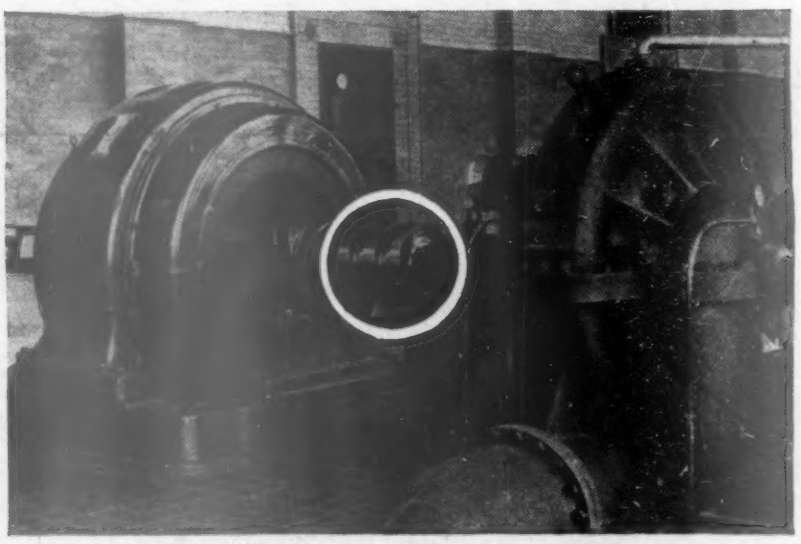
Fast's Couplings Are Simple as A-B-C

See the simple development of Fast's Couplings. A splined hub on each shaft end, a sleeve with internal splines to mesh. Oil in the sleeve carries the load between the splines.

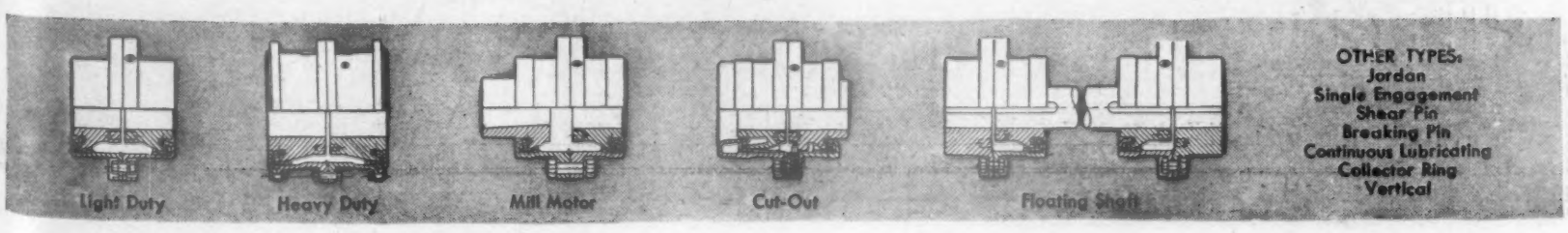








THIS NO. 6 FAST'S COUPLING connects an 1800 h.p., 600 r.p.m. motor to a 30 million gallon (per 24 hrs.) pump at the City of Montreal Pumping Station.



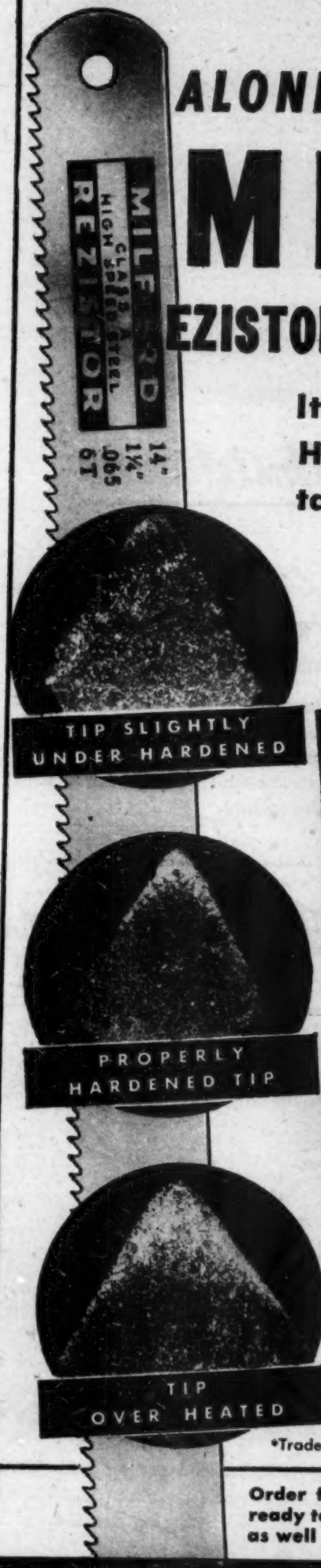
ROCKWELL **Hardness**

ALONE is not enough for

MILFORD*

EZISTOR HACK SAW BLADES

It's Laboratory Control of Heat Treatment that Maintains the Fine Cutting Edges.



The structure of the teeth . . . the "business end" of MILFORD blades . . . is controlled during every-day heat treating operations by continuous micro-photographic examination.

Sample heat-treated blades are taken from each furnace, teeth are mounted in plastic molds, and examined at 500 diameters. If the tooth structure is not just right, furnace adjustments are made and further sampling required. Even after the Metallurgical Department gives the "go-ahead," additional samples are examined during the day.

A MILFORD hardened tooth shows the "white area" of a properly hardened structure at the cutting edge, assuring maximum cutting performance. The heavier solid body below is tough for maximum strength.

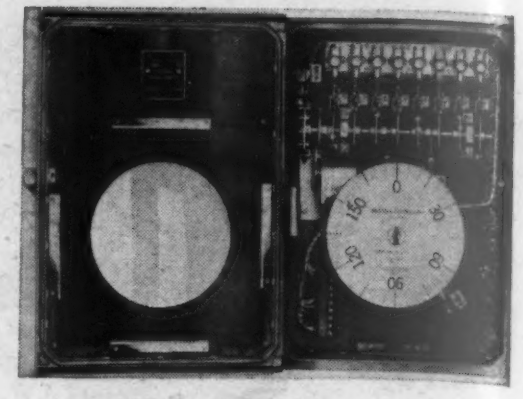
Just Another Reason Why Milford Rezistor Blades Are the Finest Hack Saw Blades that Money Can Buy!

*Trade Mark Reg. U. S. Pat. Off.

Order from your Mill Supply Distributor. He is always ready to serve your needs for all factory and mill supplies as well as MILFORD hack saw and band saw blades.

MILFORD
PROFILE AND BAND SAW BLADES
REZISTOR AND DUPLEX HACK SAW BLADES

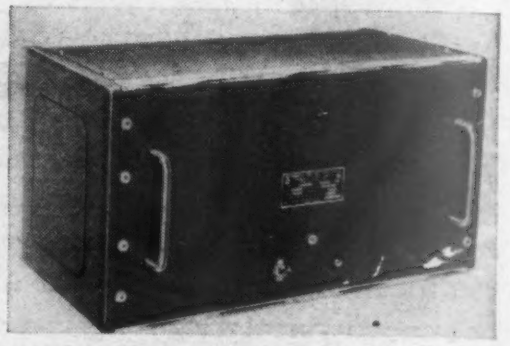
THE HENRY G. THOMPSON & SON CO.
Saw Specialists Exclusively for Over 65 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.



scale, and is set by cutting notches with a notching punch on the time scale. Any sequence of operation may be obtained. The Bristol Co., Waterbury 91, Conn.

VOLTAGE REGULATOR

Type IE Stabiline voltage regulator, an electronic unit with no moving parts, is claimed to provide instant correction of line voltage fluctuations with negligible waveform distortion. Performance is not affected by any load change from zero to full rating of the unit, maker says. Type



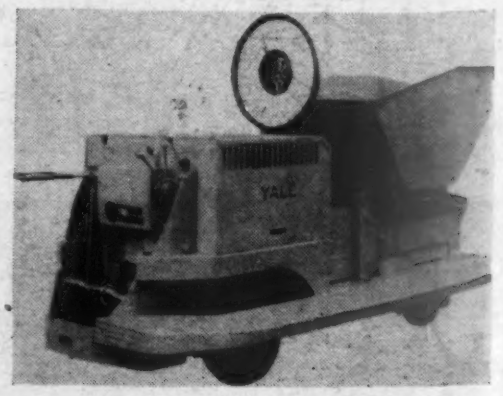
IE5101 maintains a constant voltage to any load up to 1 kva. Output voltage is held to within +0.1 volts of any value between 110 to 120 volts, for an input voltage change from 135 to 95 volts. The Superior Electric Co., 543 Laurel St., Bristol, Conn.

FLOOR COATINGS

Known as Floor-Dress, a coating made in two types, for asphalt tile and for linoleum, is said to eliminate need for waxing. The Pyroxylin-base material is applied with an ordinary paint brush over the surface, which has been cleaned and freed from wax. The product is without unpleasant odor, and dries out of dust to a non-slip surface in about ten minutes, will not crack or peel, or cause tile to curl, maker states, and it will withstand oil, grease, mild acids, alcohol, and hard use. Rock-Tred Corp., 629 West Washington St., Chicago 6.

SCALE AND DUMP TRUCK

Combining three different handling tools in a single mobile unit, truck weighs out



ASK THE
MACHINE TOOL
INDUSTRY...
"What's the Best
Maintenance Paint?"

Plenty of light for high-precision work is a necessity in machine tool plants. That calls for a highly reflective paint. Lubricating oils and coolants flow freely, too. That calls for a paint that cleans easily. Ask the maintenance men in machine tool plants what paint costs less in the long run; offers outstanding durability, reflectivity and hiding power, resistance to heat, fumes, and moisture, plus good appearance...

THEY'LL SAY

ALUMINUM PAINT!

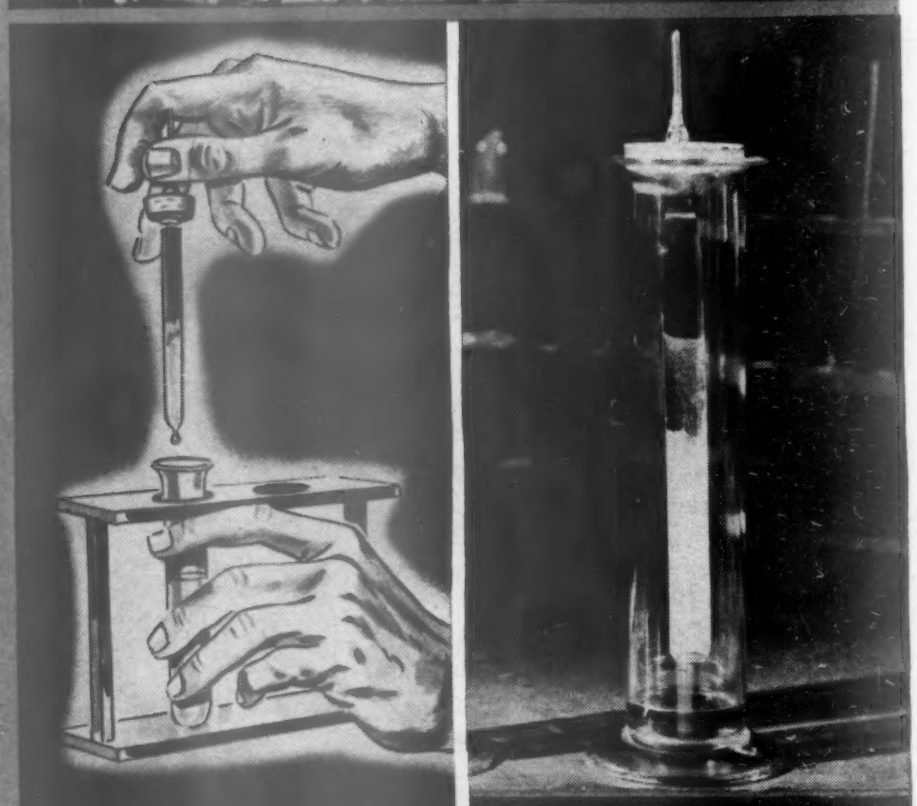
★

ASK THEIR
PAINT SUPPLIERS
"What's The Best
Aluminum Pigment?"

To be sure of the best in aluminum paints, leading manufacturers of industrial paints use Alcoa Albron Paste. They know its high quality is scientifically controlled by such tests as the check on Leafing Power shown here, in which the percentage of leafing shows clearly on the spatula. This test helps to assure high hiding power and uniformity in the paint you buy. That is why, when you ask paint suppliers about aluminum pigments,

THEY'LL SAY

ALCOA
ALBRON PIGMENT!



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1983 GULF BUILDING, PITTSBURGH 19, PA.
SALES OFFICES IN PRINCIPAL CITIES

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METALS DISINTEGRATING COMPANY INC

ALCOA
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Speeded-up production has taken its toll of plant equipment. Break-downs and unexpected failures are more numerous.

A thorough check-up now will pay dividends. And don't overlook your steam, water, and air lines. A sudden valve failure might mean loss of valuable power and production.

But should valve trouble occur, you can get help . . . quickly . . . from your near-by Lunkenheimer Distributor. Long established in the community, he has thoroughly experienced personnel and adequate stocks . . . all the facilities and "know-how" for solving your valve problems.

Whether it's an emergency call, routine repair and maintenance service, or a new installation, phone your Lunkenheimer Distributor for fast, dependable service.

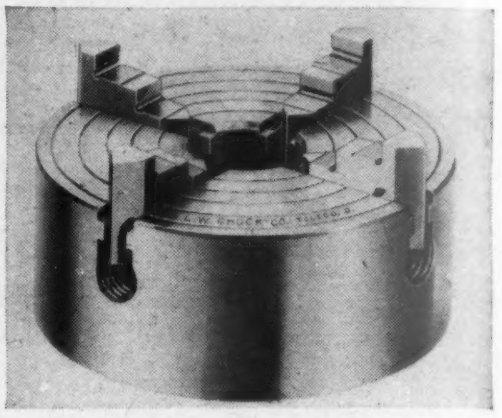
ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO. U. S. A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 34
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

LUNKENHEIMER VALVES
BRONZE, IRON, STEEL, AND CORROSION RESISTANT ALLOY VALVES
AIR DEVICES, LUBRICATORS, AIRCRAFT FITTINGS

batches, transports, and dumps them into furnaces, tanks, or hoppers. Called Portable Batching Scale-and-Dump Combination, the unit embodies a shock-absorbing dump-bucket, a platform scale, and a standard electric load-carrier truck. The 40-cu.-ft. dump hopper is supported on the scale platform by four heavy coil springs which protect the scale against shocks. The scale has a shatter-proof glass-protected dial, 24 inches in diameter, in 5-lb. gradations, and records loads weighing up to 3000 pounds. The Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia.

SMALL-LATHE CHUCK

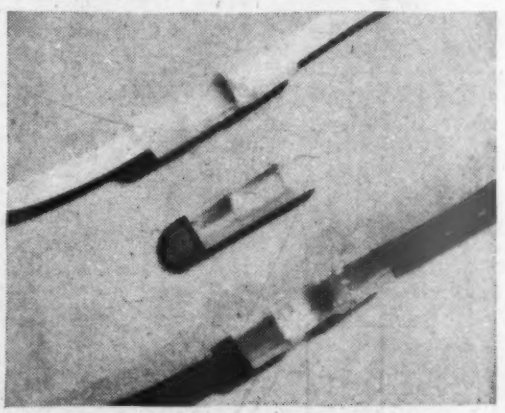
Built for small lathes, 4-jaw independent chucks, in 8-in. medium-duty and 6-in. heavy-duty sizes, have bodies of semi-steel castings. Face and outer edge surfaces are ground and run true. The jaws are steel, the steps hardened and ground,



and the screws are heat-treated. The chucks are furnished with a wrench. Also available for the chucks are finished, ready-to-mount adapter back plates with 1½-in.-8 thread, and rough adapter back plate castings. L-W Chuck Co., 40 South St. Clair St., Toledo.

INSULATED WIRE SPLICE

Addition to line of Sta-Kon pressure connectors, the No. 25 insulated splice is a seamless bronze connector protected with a translucent high dielectric plastic insulator which is impervious to oil, grease, water, chemicals, and acids,



maker says. The insulator is bonded to the connector, and cannot slip or become accidentally detached. The connector ranges in wire capacities from No. 14 to No. 20. Thomas & Batts Co., Inc., 36 Butler St., Elizabeth 1, N. J.

METALLIC PACKING

Floating seal metallic packing of simplified construction is adapted to both rod and plunger type operations, and is suitable for all types of compressors. It is said to hold 1500-lb. hydraulic pressure

..for Cutting Production Costs

Take a section of OSTUCO Steel Tubing, either seamless or welded . . . slot it, bend it and flare the ends and you've got a time and cost-saving solution to an involved production problem. That's because the uniform quality of OSTUCO Tubing permits forming and fabricating operations that match the most intricate specifications.

Right now, The Ohio Seamless Tube Company is producing seamless and welded steel tubing for use in products in hundreds of industries — forming and fabricating that tubing to conform exactly to customers' blueprints. Your product may be built better, at lower cost, through the use of OSTUCO Steel Tubing and the skills of OSTUCO craftsmen. The nearest sales engineer will gladly show you how and why.

Complete information is available, without obligation, at the nearest sales office.

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. . . not with a PORTABLE APPLETON REELITE on the job . . .

It can't happen because Portable Appleton Reelites keep excess lamp cord *reeled up,* out of the way. No chance for tangles, kinks or breaks with resulting danger to plant and personnel.

Works exactly like a window shade. Cord pulls out to length desired—where it is held by a ratchet stop while light is in use. Re-reels under spring tension.

Portable Appleton Reelites supply bright, safe light for close machine inspection, car-loading, stock-keeping and maintenance work. They'll pay off handsomely on any such job in your plant.

Sold Through Electrical Wholesalers

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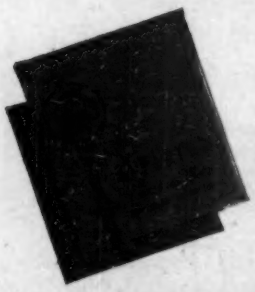
14 Branch Offices and 7 Resident Representatives in All Principal Markets

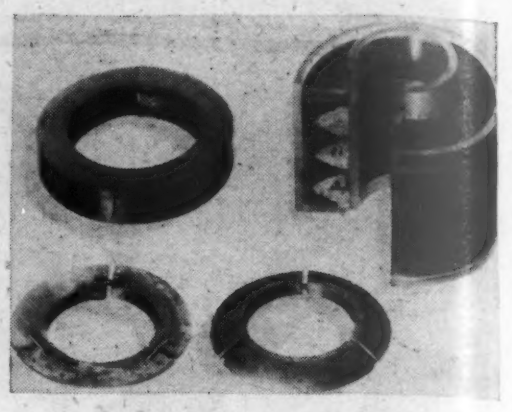


SEND TODAY!

Write for your copy of 50-page Bulletin No. 504 describing the complete line of Appleton Reelites — Portable, Constant Duty and special types for power tools, air and fluid lines; or, see Sweet's File, Page 2a/22.

Every householder who sees a Portable Appleton Reelite wants one . . . a wonderful convenience in attic, basement, garage.

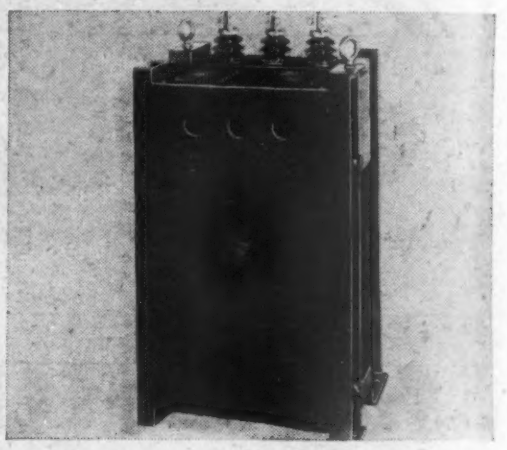
APPLETON



with one unit made up of two metal rings and a synthetic ring. Rodpak Manufacturing Co., 1315 Natoma St., San Francisco 3.

TRANSFORMERS

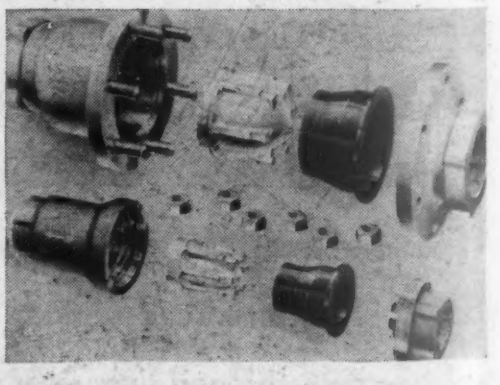
Dry-type distribution transformers utilize Class B heat-proof insulation, such as fiber-glass, mica, asbestos, and other inorganic materials. Said to feature improved natural drift, and compact built-in low voltage wiring compartment suitable for conduit wiring. Elimination



of messy and toxic liquids permits economical indoor installation at the load center without a fireproof vault, manufacturer states. Designated Type S, the transformers are made in both single- and three-phase units up to 100 k.v.a., in voltages up to 4800. Marcus Transformer Co., Inc., 32-34 Montgomery St., Hillside 5, N. J.

CHECK VALVE

Embodying no metallic operating parts that might stick, slam, chatter, or leak, line of Chexflo valves operates on low pressure differential. Sizes range from ½ to 12 inches. The tough flexible tubular operating member, comprised of a thick load section tapering down to a sensitive operating lip, requires no differential pressure to effect positive bubble-tight



shutoff, maker says. Handles air, gas, water, and refined petroleum products at temperatures to 180 deg. F. Grove Regulator Co., 65th & Hollis Sts., Oakland, Calif.

KLIXON PROTECTORS

KEEP MOTORS TRANSFORMERS SOLENOIDS VARIABLE VOLTAGE TRANSFORMERS IN HEALTHY CONDITION!

Klixon Protectors keep motors or other equipment working by protecting them from burnouts due to overloads or shorts.

Unprotected motors may burn out due to overloads, shorts, and poor ventilation. Klixon Protectors will prevent this.

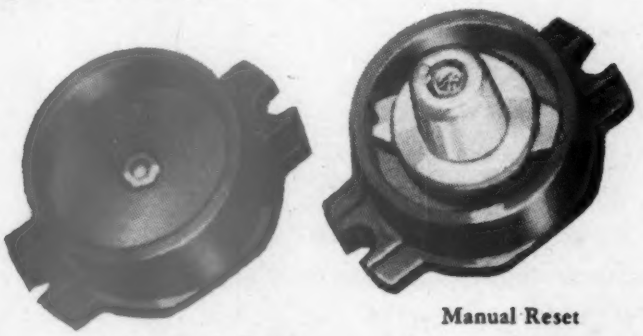
You'll never have to worry about motors and other electrical equipment overheating and burning out . . . not if they are equipped with built-in Klixon Protectors.

Built in by the manufacturer of the particular equipment, Klixon Protectors provide a tested and proven combination of a protector matched to the thermal characteristics of the equipment.

Should a motor, transformer, solenoid or variable voltage transformer become overloaded and dangerously hot, the Klixon Protector opens the circuit preventing a possible burnout. The protector provides full protection without limiting safe output. Harmless momentary overloads do not cause nuisance tripouts.

Klixon Protectors are unaffected by shock, motion or vibration. They are available in automatic and manual reset types in a wide range of types and ratings.

Protect your equipment by specifying Klixon Protected motors, transformers, solenoids and variable voltage transformers.



Automatic Reset

Manual Reset

KLIXON

TRADE MARK REG. U. S. PAT. OFF

107 907

SPENCER THERMOSTAT COMPANY 2107 FOREST STREET, ATTLEBORO, MASSACHUSETTS

"Here is another example of SUPERKOOL superiority for precision grinding"

...excerpts from D. A. Stuart Oil Co. Performance Report on SUPERKOOL 31K

PROBLEM: Precision grinding finish of 4 to 6 micro inches required on compressor valve units, using a 500 grit wheel on Norton Hyprolap machines. Previous mixture of 1 part kerosene and 2 parts red engine oil unsatisfactory.

SOLUTION: Use of a 1 to 1 blend of SUPERKOOL 31K and kerosene.

RESULTS: Operator reported less mist from the machine...Production increased to 200 pieces...Finish improved 2 to 4 micro inches...subsequent tests proved completely satisfactory results by using SUPERKOOL 31K straight on micromatics, and the above dilution on the Hyprolap machines... Foreman and lubrication engineer well pleased...orders for SUPERKOOL 31K to be placed as required.

O. M. Gibson

D. A Stuart Oil Co., Representative

STUART *service goes with every barrel*

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D. A. Stuart Oil Co.

2735 SOUTH TROY STREET, CHICAGO 23, ILL.

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more about the items on this page

Letters to the addresses given will bring you further information.

"THINKAMERICAN" POSTERS are designed to promote a sounder understanding of business economics. Posters are 20x27 inches; are printed in colors; and are supplied to businesses on a weekly program basis. Kelly-Read & Co., Inc., 508 St. Paul St., Rochester 5.

PLASTIC MATERIAL offered in continuous lengths 54 inches wide. Material has a patent finish and is flexible. Manufacturer foresees possible use for product in the manufacture of furniture, luggage, and decorative paneling. United States Rubber Co., Rockefeller Center, New York.

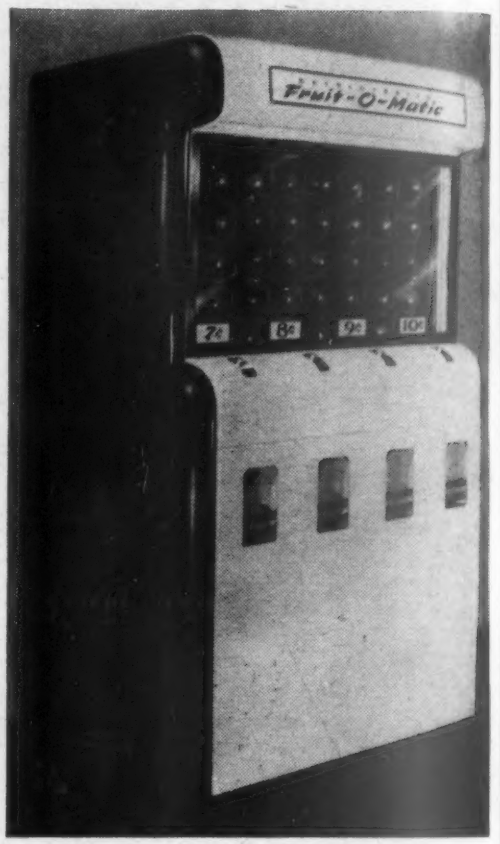
TEXTILE FLAMEPROOFING is said to be accomplished with an organic compound that will not alter color and other characteristics of fabrics. Eronel Industries, 5714 West Pico Blvd., Los Angeles.

ABRASIVE SELECTOR indicates the proper abrasive combination for more than a hundred specific sanding and finishing problems. Sterling Tool Products Co., 363 East Ohio St., Chicago 11.

VISIBLE RECORDS SYSTEM incorporates portability, work- and space-saving features, and special record-keeping controls. Federal Business Products, Inc., 90 Gold St., New York 7.

RESIN PLASTICIZER is being introduced commercially. A true polyvinyl chloride, the new product offers ease of processing —it may be molded, cast, coated, or dipped to produce products commonly made by calendering, solution, or latex coatings. Such products include coated papers and fabrics, thin films for waterproofed materials, and thicker sheeting for upholstery and shoes. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15.

WORKTIME COMPUTER converts clock time to work time. It is designed to reduce clerical work and avoid errors. Allied Research Corp., P. O. Box 17, Somerville 43, Mass.

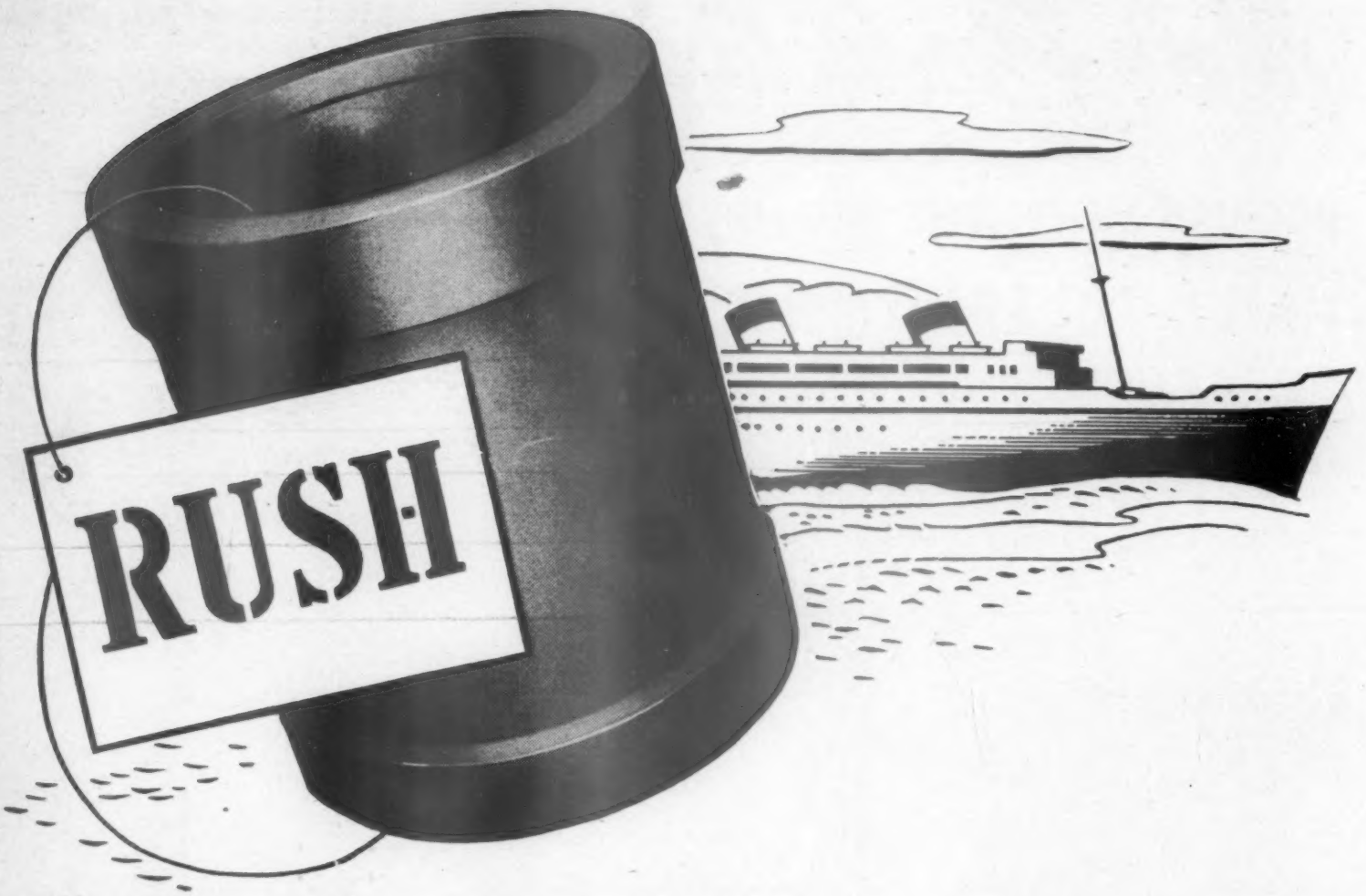


SHOP FRUIT VENDOR dispenses refrigerated apples, oranges, pears, and automatically returns correct change. Kold Krisp Apple Service, Inc., 7855 Sepulveda Blvd., Van Nuys, Calif.

DRAFTING TRAY for designers and draftsmen affords accessible place for working tools. Tray is mounted on a bracket and can be moved to various positions over the working area. A. Wayne Nunemaker & Associates, 103 South Wells St., Chicago 6.

LIQUID-FILLING TIRE PUMP, lightweight and self-priming, fills tractor, implement, and construction equipment tires with water or calcium chloride solution. Gorman-Rupp Co., Mansfield, Ohio.

NEW POLYSTYRENE withstands scalding temperatures and is said to have excellent moldability in standard injection and extrusion machines. Wide usage is forecast for applications in household accessories, surgical appli-



N·B·M EIGHT-DAY BRONZE CASTING SAVES CRIPPLED STEAMSHIP

The sailing of a steamer from Mobile, Ala., was recently delayed because a new bronze pump liner was needed.

The steamship line called us Friday. Our pattern shop swung into immediate action. The core box was delivered Monday, the pattern Tuesday. On Friday, the 1940 lbs. casting was shipped . . . an eight-day wonder casting.

We wouldn't care for rush work every day . . . but if you are in an emergency, we'll be glad to help out.

N·B·M BRONZE CASTINGS
We put more service into them — you get more service out of them

NBM

Brake Shoe NATIONAL BEARING DIVISION
ST. LOUIS • NEW YORK

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More Productivity

BEGINS WITH THE RIGHT HANDLING EQUIPMENT

FLOOR TRUCKS

Modern floor trucks that meet today's requirements for greater efficiency in the handling of materials . . . easy on the man, the load and the floor. Durable, they retain that new, free-running action year in and year out. Two models and a variety of platform sizes to fit every need.

STEEL-FORGED CASTERS

Only a forging possesses the high tensile strength required to meet the stresses placed upon truck casters by modern industry. Rapids-Standard casters are "Steel-Forged" throughout. . . . All parts are precision made units with all wearing parts fully machined and assembled to close tolerance. Swivel ball raceways hardened by the exclusive Flame-Hardening process to 500-550 Brinell.

Rapids-Standard casters are made in both rigid and swivel types with a choice of bearing depending upon the service for which they are intended. Wheel types include metal, Resinoid and Rubber. These casters wear better . . . longer. They are standard equipment on all Rapids-Standard floor trucks.

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Models are available with single or double handles, solid plate or open nose. The combination of your choice—with wheels of Nicro-Steel (NH), Resinoid (DUR), Air wheel rubber tired (AGH) or General Pneumatic (GP).

*Trade Mark Registered

Model CK-45-AGH

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The Rapids-Standard Co., Inc.

Sales Div. — 370 Peoples Nat'l Bank Bldg., Grand Rapids 2, Michigan

ances, lamps, radios, and similar products. Plastics Div., Monsanto Chemical Co., Springfield, Mass.

REPORT WRITING described in a study on how to present the results of laboratory research work. Evans Research & Development Corp., 250 East 43rd St., New York 17.

NAILABLE STEEL FLOORING is designed to reduce maintenance costs for freight cars, trucks, and trailers. Floors are made of low-alloy, high-strength steel that resists abrasion and corrosion. Nailing grooves are said to have greater holding force than wood. Great Lakes Steel Corp., 3580 Penobscot Bldg., Detroit 26.

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CUTTING SPEEDS SELECTOR gives proper speeds and feeds for all common operations on several grades of stainless steel bars. Republic Steel Corp., Cleveland 1.

RUBBER-PLASTIC LIQUID is non-flammable and can be sprayed on highly polished metal parts to protect them from dirt, moisture, and fingerprints. Coating is easily removed by peeling. Rubba, 1015 East 173rd St., New York.

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Ask us which type of Aluminum Casting is best for your product . . . and you get a frank, technically-sound answer. We make all three types, have no special bias in favor of any one of the three. Our job is to see that you use the casting that's best for your product . . . and for your production cost figures.

Each type of Alcoa Aluminum Casting —sand, permanent mold, and die—has its points. Your product may require a combination of two types, or even all three.

Our engineers and our 59 years of aluminum know-how are at your service to help you get the most from Alcoa Aluminum Castings. ALUMINUM COMPANY OF AMERICA, 2126 Gulf Bldg., Pittsburgh 19, Penna. Sales offices in leading cities.

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For broad information on **"dag"** colloidal graphite, its 19 principal properties, and scores of applications send for the 16 page reference and data book below.

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ACHESON COLLOIDS CORPORATION

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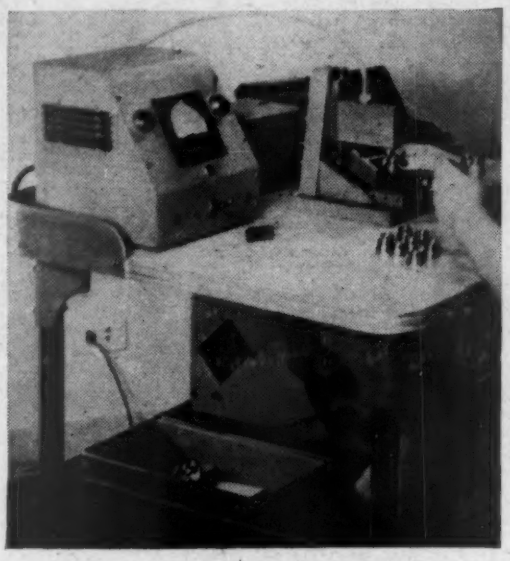
(Lubricants containing **"dag"** colloidal graphite are available from major oil companies.)

uses an exhaust fan and a water curtain, and was developed by Otis Elevator Co., Westinghouse Electric Corp., and Grinnell Co., Inc.



INSPECTING MACHINE automatically measures parts to close tolerances and segregates parts that are over or under in size. Machine is designed especially for use in small shops. The DoAll Co., Des Plaines, Ill.

METAL TAGGING OUTFIT provides permanent identification of billets during storage and offers several warehousing and industrial applications. Tags are embossed with interchangeable type and nailed into steel billets. M. E. Cunningham Co., 180 Carson St., Pittsburgh 19.

FILMS:

The Flow Process Chart and How to Use It, 16 mm, color, sound, shows how to prepare a flow process chart, and is recommended for use in the study of work simplification. Motion Picture Div., Library of Congress, Washington 25.

The Inside Story, color, sound, depicts personnel relations subjects tied in with the manufacture of cotton products at Chicopee Mfg. Corp., a subsidiary of Johnson & Johnson. Distribution through The Princeton Film Center, Princeton, N. J.

Saving With SUIAP, color, sound, traces the development of accounting methods from those used in the old-fashioned country store through to modern machine methods of posting accounts. Systems Div. of Remington Rand, Inc., New York.

Man-Au-Trol—Master of the Machine, 16 mm, sound, shows the Bullard Man-Au-Trol in action; also how it is set up, and how it operates either automatically or manually. The Bullard Co., Bridgeport 2.

Interchangeability Without Jigs, 16 mm, sound, shows the Man-Au-Trol Spacer, its set-up and operation. The Bullard Company, Bridgeport 2.

The Way Out, 16 mm, sound, color, tells the story of conveyor belts in underground mines. Sales Promotion Dept., Goodyear Tire & Rubber Co., Akron 16.

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● In your plant, unsafe handling of easily-damaged materials can often result in higher manufacturing costs and lower product quality.

Reading Multiple Gear Chain Hoists position your materials with the highest degree of money-saving safety and accuracy. Sturdy maple brake wheel inserts hold any load from ¼ ton to 25 tons snugly against the friction disc until the load is to be moved. Maximum lifting power plus a safe, constant-speed lowering motion have given Reading Hoists wide user acceptance for the past 40 years.

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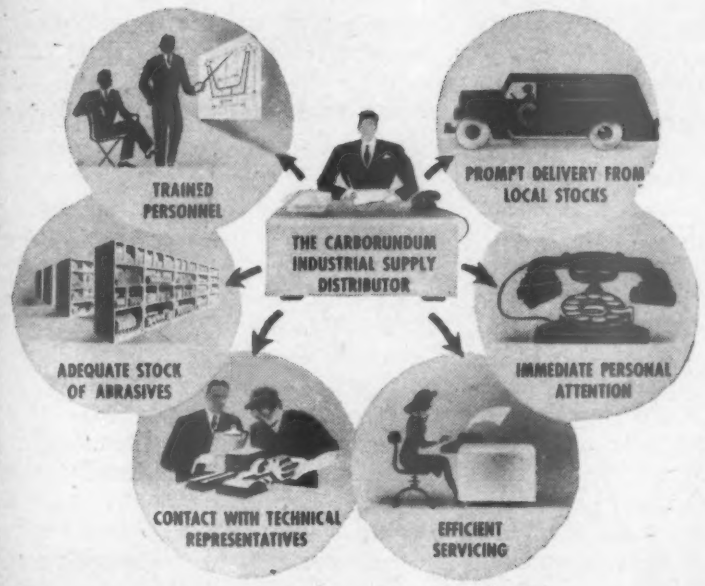
A BUYING GUIDE FOR ABRASIVES

POINT No. 6

LOCAL DISTRIBUTOR SERVICE



With progressive purchasing methods dictating improved efficiency of supply, the services of your CARBORUNDUM distributor assume increased importance. Prompt delivery of standard wheels, coated abrasives, sticks and stones, and grains by CARBORUNDUM is assured from large and varied stocks conveniently located nearby. Factory inventories of these items can be safely and economically reduced. More efficient use of abrasives is promoted through a local staff, trained by CARBORUNDUM, and familiar with varied applications. They are informed on latest developments and have access to CARBORUNDUM representatives when the problem is too difficult or unusual. Intelligent handling and efficient office routine is also pointed to by some customers who prefer the personal consideration and attention rendered by these modern distribution units. These services account in part for the increasing preference for products by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

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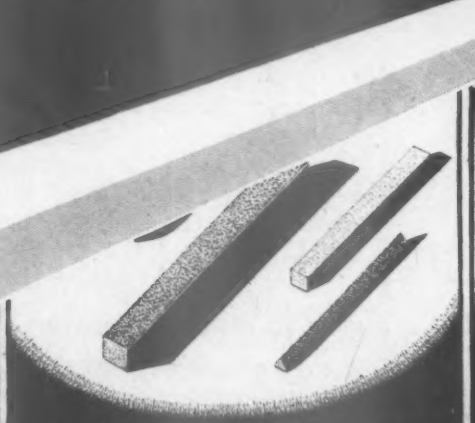
TRADE MARK

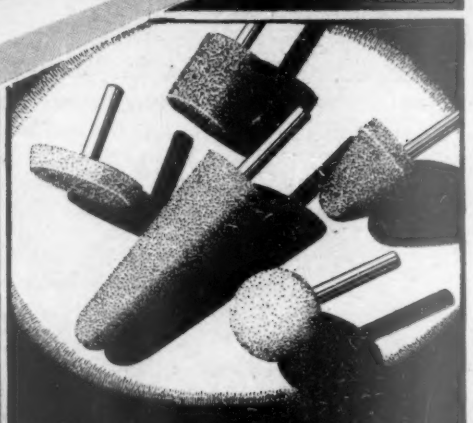
BONDED ABRASIVES

COATED ABRASIVES

ABRASIVE GRAINS AND FINISHING COMPOUNDS



Tool Room sticks and stones that cut fast . last long . and hold their form



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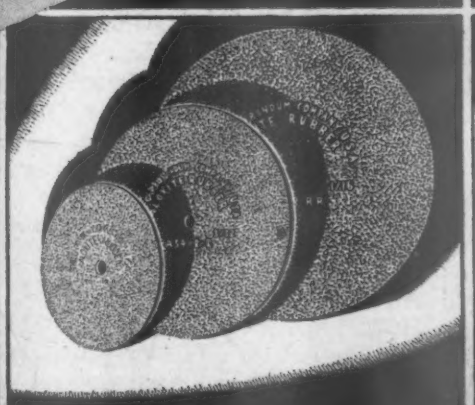
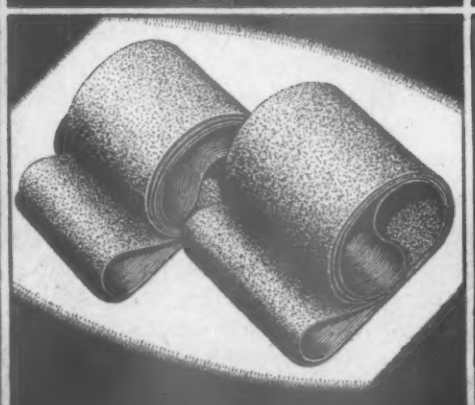
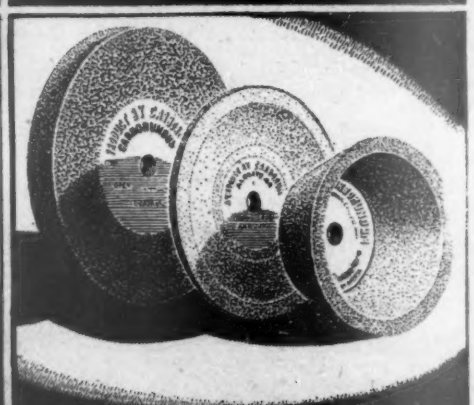


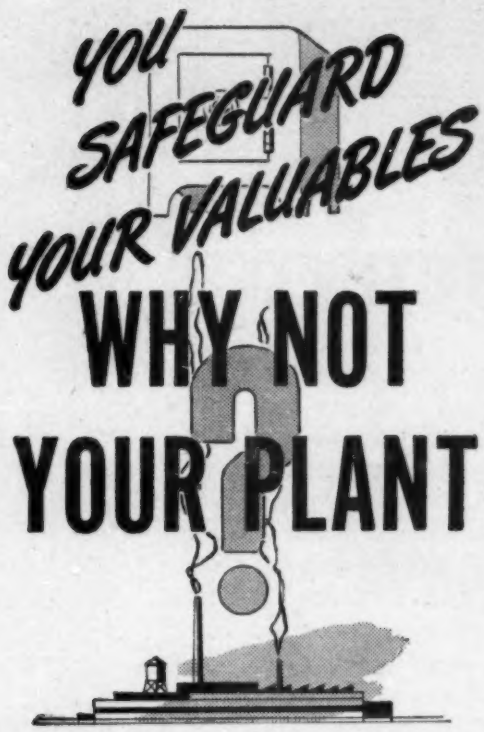
Cutting-Off Wheels . . . the modern tool for faster, less costly, more finished cuts



A Coated Abrasive for every sanding and finishing condition

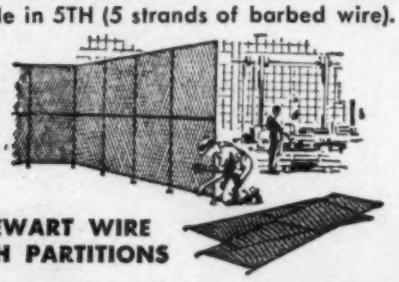


All standard shapes are supplied in grinding wheels by CARBORUNDUM



It can be quickly and effectively accomplished by surrounding your property with a Stewart Non-Climbable Chain Link Wire Fence. And you are assured of greater protection over a longer period of time because the Stewart exclusive Oval-Back, All-Beam fence framework is the heaviest and strongest manufactured. Before you buy, be sure to see what Stewart has to offer. Catalog No. 83, containing complete information, will be sent on request.

Stewart 3TH Chain Link Wire Fence. Also available in 5TH (5 strands of barbed wire).



STEWART WIRE MESH PARTITIONS

Sectional with standard panels. May be arranged to fit any space. Ideal for locker rooms, toolrooms, storage rooms.

Other Stewart Products: Iron Picket Fence and Gates; Iron and Wire Window Guards; Sliding and Folding Steel Gates; Iron Railings; Steel Settees; Skylight and Machinery Guards; Bronze Plaques, and many others. When writing for information, please mention products in which you are especially interested.

Stewart maintains sales and erection service in all principal cities.

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Stewart IRON and WIRE FENCES

SIGNIFICANT LABOR DEVELOPMENTS

BENJAMIN WERNE, Lecturer in Government Regulations, New York University, and a Member of the New York Bar

Period Surveyed: May 1 to June 1

TREND INDICATORS

Veterans' Rights

TIMELINESS OF APPLICATION

Veteran who was employed by a company in a position different from the position he held under a predecessor owner made no application for reinstatement until after the expiration of the statutory 90-day period. At the time of reemployment with the defendant company, the former owner, for whom the veteran worked just prior to his induction, neither owned nor controlled the business. The evidence was clear that the defendant company was an individual business entity formed for a *bona fide* purpose. The court held the application was untimely and the defendant company's position had so changed as to make it unreasonable to reemploy the veteran in his former position. (Gimpelson v. Chicago Hotel Supply; USDC Calif.)

REINSTATEMENT ORDERED

A veteran who was employed at a studio at the time of his induction was entitled to reinstatement although the union denied him the necessary work permit required under the terms of an agreement in effect between the union and the defendant. The court directed the union to issue and renew any work permits necessary to authorize the veteran's employment at the defendant company under the terms of the working agreement between the union and the company. (Smith v. General Service Studios; USDC Calif.)

DUTY TO REPLACE EMPLOYEES

An employer's plant had undergone changes growing out of more specialized work. This resulted in a more detailed classification of jobs, and some of the work performed by the veteran before going into service had been placed in another classification, with a higher bracket of pay than that which was enjoyed when the position was held by the veteran. The court held that in this case there was no duty to replace other employees to make room for the veteran, because in such situations the rights of others are involved, and such matters should not be dealt with unless these parties are before the court. The primary duty of the employer under the Act is the restoration of the veteran to his *former* position, or to a position of like seniority, status, and pay. The employer fulfilled his obligation under the Act by reinstating the veteran in his former position. (Lowe v. Wright Aeronautical Corporation; USDC N. J.)

RIGHT TO INCREASE

A veteran who was reinstated to his former position at former wage rate was discharged by the company shortly after his reinstatement. Wage rates for all employees were determined by a closed shop contract in effect between the union and defendant company. Veteran, having learned that his wage rate was lower than the rate established for his position by the collective bargaining agreement, sought reinstatement with compensation for lost earnings and reimbursement for the discrepancy. The veteran was ordered reinstated but the reimbursement for the claimed discrepancy was held to be beyond the court's jurisdiction under the Draft Act. The Act, said the court, is intended to protect the veteran from loss of ground in his employment by reason of his service in the armed forces. Since the veteran on reinstatement received the same pay which he received before induction, the court cannot see how the resulting underpayment was in any sense an incident of his employment having been interrupted by military service. (Daniels v. Rietheimer & Barfield; ED Pa.)

RIGHT TO FULL BENEFITS OF OLD JOB

An employer must reemploy a veteran in his former job as a salesman in his old territory at his old commission rate, even though the job now is a much better job in terms of pay, because of the employer's improved circumstances. The employer did not offer the veteran a position of like "status and pay" when he offered the veteran reemployment in "a" territory at a smaller commission rate, although his business had prospered while the veteran was in the armed service. He was not offered his old commission of 10 per cent but was offered 7½ per cent. Such offers as to territory and commisison do not square with his status and pay before he entered the service and do not satisfy the statute. (Levine v. Verman; CCA-7)

Wage-Hour

EXTENT OF COVERAGE

The Fair Labor Standards Act applies to office and warehouse employees of a firm which was engaged in the purchase and wholesale distribution of gasoline, motor oil, fuel oil, tires, batteries, and other automobile supplies. Although the

To Solve YOUR Floor-Cleaning Problem

CHOOSE *A Job-Fitted Finnell!*

Since individual floor-cleaning problems differ widely, no one machine can serve the needs of all industries effectually and economically. The area and arrangement of the floors, whether congested or open, type of flooring and production — these determine the equipment. Recognizing that fact, and guided by four decades of practical experience in developing and manufacturing floor-maintenance machines, *Finnell* offers *more than a score* of models and sizes. From this complete line, it is possible to choose *job-fitted* equipment—equipment that fits the need in size as well as model. A *Job-Fitted Finnell* provides the greatest brush coverage consistent with area and arrangement of the floors and other conditions—whether the job calls for wet scrubbing, dry scrubbing, or dry cleaning . . . or for waxing or polishing.

The *Finnell* illustrated, a *Self-Propelled Scrubber-Vacuum*, is a complete cleaning unit *all in one*. It applies the cleaning solution (or scouring powder), scrubs, rinses if required, and picks up. Has a cleaning capacity up to 8,750 sq. ft. per hour! For consultation, free floor survey, or literature, phone or write nearest *Finnell* branch or Finnell System, Inc., 2507 East Street, Elkhart, Indiana. Canadian Office: Ottawa, Ontario.

FINNELL SYSTEM, INC.

Pioneers and Specialists in

FLOOR-MAINTENANCE EQUIPMENT AND SUPPLIES

BRANCHES IN ALL PRINCIPAL CITIES

A COMPLETE ENGINEERING ORGANIZATION

Is at your service . . .

This map is of direct interest to firms contemplating the manufacture of their products in Canada. It illustrates the nation-wide facilities of the Dominion's oldest steel fabricators which are staffed and equipped to serve almost every phase of heavy industry. There are two distinct ways in which we can serve you:

1 If you are intending to build your own factory, we can:

A Design, fabricate and erect the steel framework of your factory and manufacture all necessary tanks, pressure vessels and other platework.

B Manufacture and erect cranes or other handling equipment.

C Manufacture and install your boiler plant.

D Supply your requirements for warehouse steel.

2 If you do not intend to build your own factory:

If your product involves steel fabrication, machine shop work and assembly, we can in many cases undertake *the whole manufacture* in our own shops, thus relieving you of considerable capital expenditure.

We have a broad experience in the production of equipment to our customers' designs or to designs developed by us to meet their requirements.

DOMINION BRIDGE COMPANY LIMITED

Write for illustrated booklet FM *"Builders in Steel", describing the Dominion Bridge organization. Address enquiries to P.O. Box 280, Montreal, Canada.*

PLANTS AND OFFICES IN PRINCIPAL CITIES OF CANADA

LABOR DEVELOPMENTS *(continued)*

firm maintained an office and warehouse in South Carolina, and all of its sales and deliveries were made in the state of South Carolina, and the greater part of the merchandise was purchased in that state, approximately 20 per cent of the goods distributed by the firm were purchased outside of South Carolina and shipped into the state by rail or express. All the employees worked interchangeably on all types of work in their departments, and no attempt was made to segregate interstate from intrastate activities. The goods purchased outside the state were not ordered or destined for special customers, and there was no continuous movement of particular goods from the producer outside the state to customers within the state. The employees subject to the Act were engaged in writing letters and in performing other work in the purchase and receipt of out-of-state goods or were engaged in unloading the goods from railroad cars and trucks upon arrival at the employer's warehouse and performing the other usual duties of receiving goods. These activities did not lose their interstate character merely because the interstate movement ended upon their completion, so that the rest of the business consisted in the intrastate handling and delivery of the goods. (McComb v. Herhiby; CCA-4)

NOT COVERED

Carpenters and painters, who constructed, maintained, and repaired houses owned by their employer and occupied by other employees of the same employer, who also operated a plant in which cotton textiles were manufactured for interstate commerce, are not covered by the Fair Labor Standards Act. The Act does not extend to occupations merely affecting interstate commerce. Employees claiming protection of the Act must establish facts showing that the work done by them has some substantial relation to production of goods for interstate commerce. The residences upon which the painters and carpenters worked were in no sense devoted to manufacture for commerce. The residences were occupied only as homes for some employees and their families. The applicability of the Act depends on the work of the employee, not the business of the employer. (Morris v. Beaumont Manufacturing Company; USDC W. S. Calif.)

Watchmen employed to protect the property of a coal and supply company, a small portion of whose business was regularly in interstate commerce, and to protect the property of another company which made sporadic and occasional shipments of concrete in interstate commerce, are not covered by the Wage and Hour Law. The test of coverage for an employee is whether he himself is engaged in commerce. Watchmen were not engaged in interstate commerce or in the production of goods for such commerce within the meaning of the statutory coverage provisions. While watchmen are under the Act if the employer is engaged in the production of

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Here are just a few...

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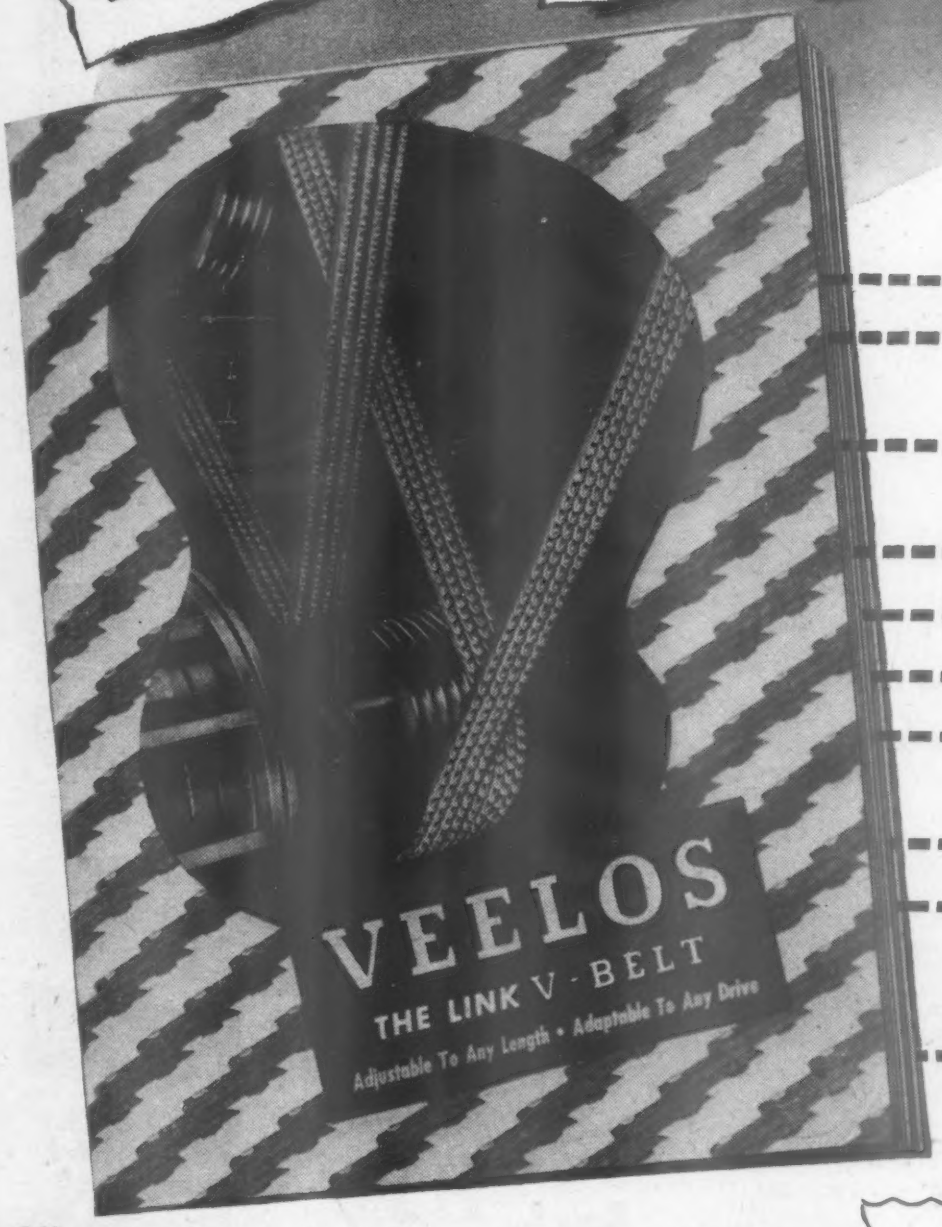
Belt replacements for any length drive are always available from a reel of Veelos.

Expensive Belt Inventories Ended
Four reels of Veelos replace up to 316 sizes of endless V-Belts. Veelos takes up only trifling storage space . . . simplifies stock records.

Costs Far Less to Install
Belts are quickly uncoupled, made endless and installed. Installation savings run as high as 9/10 the cost of installing endless belts.

Easy Adjustability
Uniform tension maintained just by removing one or more links. On fixed center drives, slide rails and pivoted motor bases are not needed.



14 Important Advantages *(Page 2)*

Four Reels replace up to 316 Sizes of Endless V-Belts (*Page 3*)

Two Types Cover All Drive Requirements (*Page 5*)

Special Applications (*Page 5*)

Construction (*Page 6*)

How to Measure (*Pages 7 and 9*)

How to Couple and Uncouple (*Page 8*)

How to Install (*Page 9*)

Engineering Data: Selection and Length Tables, HP Ratings, etc. (*Pages 10 and 11*)

Installation Photos of Veelos at Work in a Wide Variety of Industries (*Pages 12 to 24*)

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THIS fact-packed catalog describes in detail 14 distinct advantages of Veelos, the link V-belt. It shows Veelos in action on drives in a wide variety of industries. You will find easy-to-read instructions, applications, installations, engineering data. Send coupon for the book that will bring many benefits to your plant.

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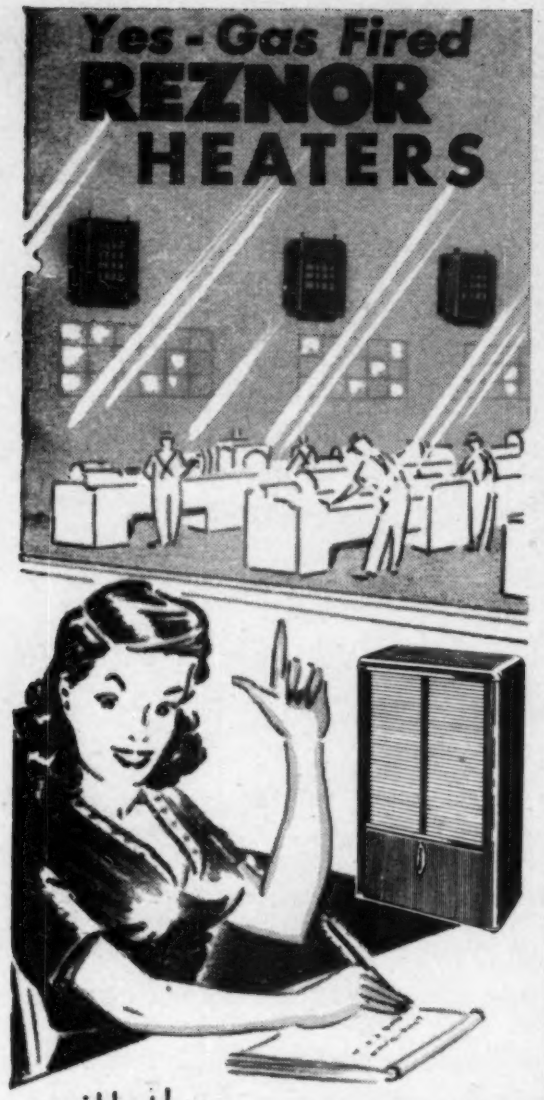

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A SIZE
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goods for commerce, such employees are not under the Act when the employer is only engaged in commerce. Although the employer was engaged in commerce, the watchman was not so engaged in so far as his protection of the employer's property was concerned. (Eldridge v. Servance Coal Company; USDC E. Tenn).

Porters, watchmen, elevator starters, and elevator operators employed by the owner of a building are not covered by the Fair Labor Standards Act where only part of the tenants were engaged in some measure in the production of goods for interstate commerce, no substantial amount of floor space occupied by any tenant was so employed, little production was carried on in the building, and service employees did not enter premises of or render special services to tenants. In order to determine whether service employees are covered by the Act, the court must view the situation as a whole. It cannot apply the mechanistic test of whether 20 per cent of the tenants produced goods for interstate commerce in some degree. The fact that a tenant was engaged in the production of goods for interstate commerce does not mean that the whole space occupied by the tenant becomes tainted thereby. The mechanical 20 per cent test has been found too rigid for proper application in the judicial field. (Vryones v. Certosa Corporation; USDC S. N. Y.)

HELD NON-EXEMPT

The test to determine whether an employee is an executive or administrative employee exempt from the Act, is the type of work and duties actually performed by him, and not the high-sounding or important title given him by his employer. Paymaster and assistant paymaster are non-exempt employees, since their work is largely clerical. Payment of salaries and wages is an important and integral part of management and general business operation, and the evidence indicates that the activities of the paymaster and his assistant require them to compare signatures on letters written with the signatures on file at the plant for the purpose of determining the genuineness of the signature. However, the court did not find that these employees were exercising any real substantial judgment and discretion in that. (Walling v. Armour & Company; USDC Kans.)

WAGE AGREEMENT INVALID

A wage contract which provided that "the hourly rates for those regularly employed more than 40 hours per week shall be determined by dividing their weekly earnings by the number of hours employed, plus one-half of the number of hours actually employed in excess of 40 hours," is invalid because the hourly rate under contract is not the "regular rate" of pay within the meaning of the statutory overtime compensation provisions. Instead of making use of the number of hours actually worked, only

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You can depend upon Redington to make immediate delivery of these sturdy, 100% accurate Counters—"Watchdogs of Production." In models to fit punch presses, pumps, screw machines, packaging machines . . . conveyor lines, can making and box making machinery . . . in fact, all types of machinery and production lines. Easy to install. Write for Catalog.

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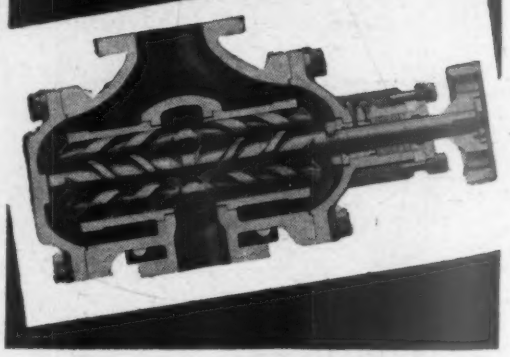
NO GEARS



The IMO PUMP requires no gears, because the fluid pumped is propelled from suction to discharge by the action of three intermeshing rotors. That's all there is to it—no gears, valves, vanes or pistons!

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An *Exclusive* combination of Benefits are now Created for You by These New Heavy-Duty Jacks!

PATENTED DOUBLE PUMP—all in ONE unit! Speed pump provides fast load-contact—powerful load pump cuts in automatically! No shifting handle or double-yoking as with separate pumps.

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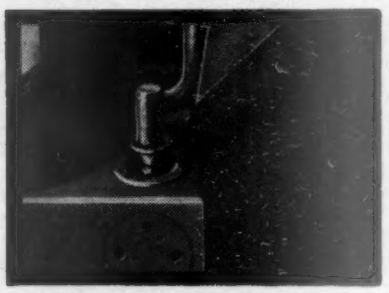
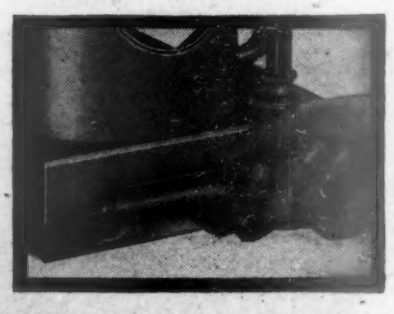
GAUGE EQUIPPED — Base is tapped for hook-up of gauge to show amount of pressure exerted — for measuring or testing applications.



PUMP BEAM PROTECTION is provided by handle and base. Pump is concealed. Beam is protectively enclosed at entry point to base.



SUPER STRONG BASE—machined from single piece of non-porous steel. Release valve is recessed to prevent accidental lowering and breakage.

CHECK these cost-saving features of the New 30-ton FB-11 and the 50-ton GB-11. They bring you outstanding new jack performance never before known in industry. (Other Blackhawk models include 3, 5, 8, 12, and 20-ton sizes.) See your Blackhawk Industrial Supply Distributor for full information on these new Jacks.

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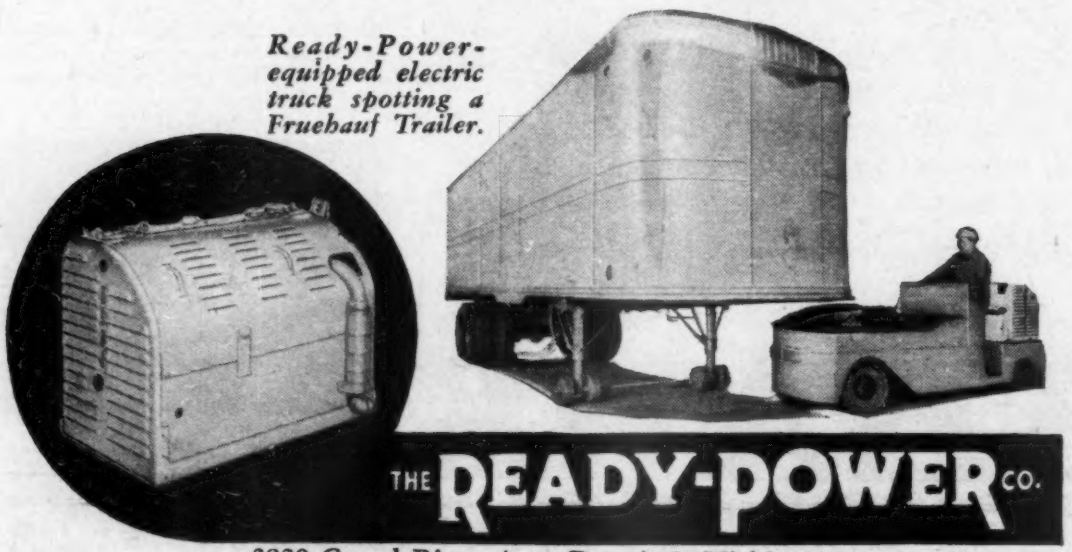

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the hours the employee was scheduled to work, and the weekly wage for such scheduled work week, entered into the calculation of the non-overtime hourly rate. The hourly rate as derived from the formula remained constant, therefore, regardless of whether the employee worked the scheduled number of hours during the week or a greater or lesser number. In effect, the agreement, instead of directly stating a fixed hourly rate in terms of a stipulated amount per hour, provided a formula whereby such a fixed hourly rate could be calculated. Under the agreement, weekly compensation varied according to the number of hours worked in that week. Thus, in case an employee was unable to work all his scheduled hours because of to an "excusable cause," he was paid at the formula rate with the provision, however, that six of the hours worked should be compensated as overtime regardless of whether the total of hours actually worked was greater or less than 40 in that week. A wage plan is not rendered invalid simply because, instead of stating directly an hourly rate of pay, the parties stipulate a weekly wage inclusive of regular and overtime compensation for a work week in excess of 40 hours and have provided a formula whereby the appropriate hourly rate may be derived therefrom. However, in this case the hourly rate derived from the formula was not the regular rate of pay within the statutory meaning and the wage agreement did not make adequate provision for overtime. (149 Madison Avenue Corporation v. Asselta, USSC)

COMPUTATION OF HOURLY RATE WHERE WORK WEEK IS VARIABLE

In computing the overtime compensation due employees whose regular work week is variable, the regular hourly rate is determined by dividing weekly salary by the number of hours worked in any particular week. The employees' regular work week was variable in numbers of hours and consisted of the number of hours actually worked per week, not 40 hours. (Mabee v. White Plains Publishing Company; N. Y. Supreme Court, Appellate Division, Second Department)

LABOR MANAGEMENT RELATIONS

*MANAGEMENT'S RIGHT TO SPEAK FREELY

An employer may express his disapproval of the union during the month preceding an election provided his actions *per se* are not coercive or of a nature which would necessitate setting aside the election results. The employer characterized the union's organizational efforts as an attack upon the mutual interests of the employer and the employees. After listing various benefits granted the employees, such as wage increases, bonuses, insurance benefits, and

* In this classification, items marked with an asterisk also are considered to be trend indicators.

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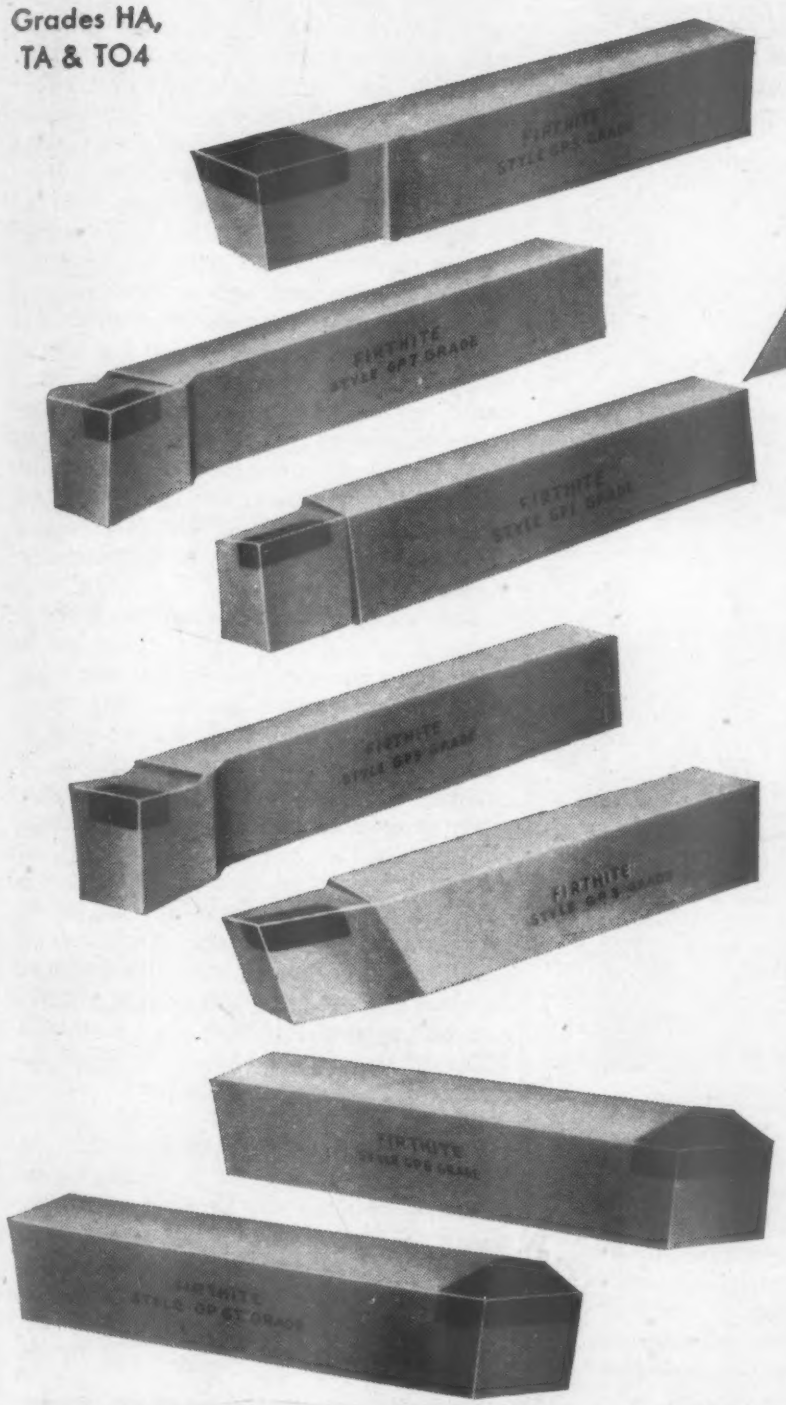

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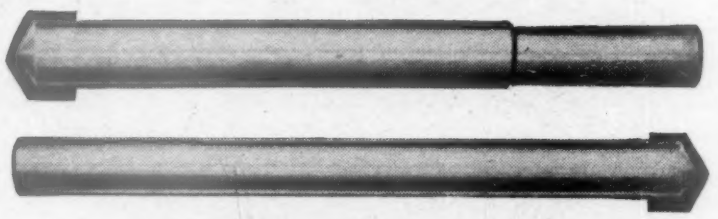

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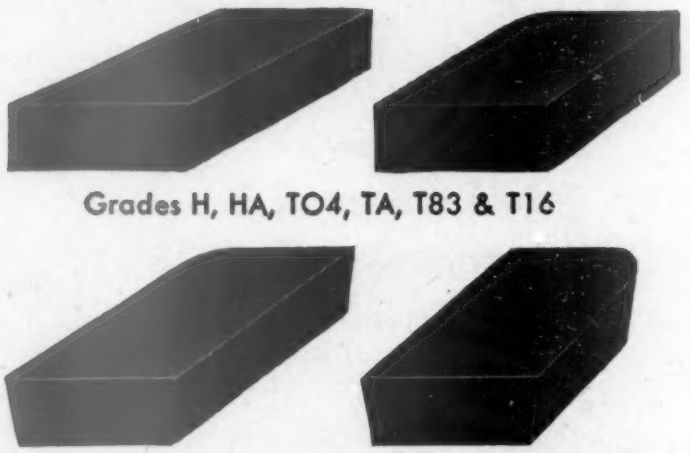

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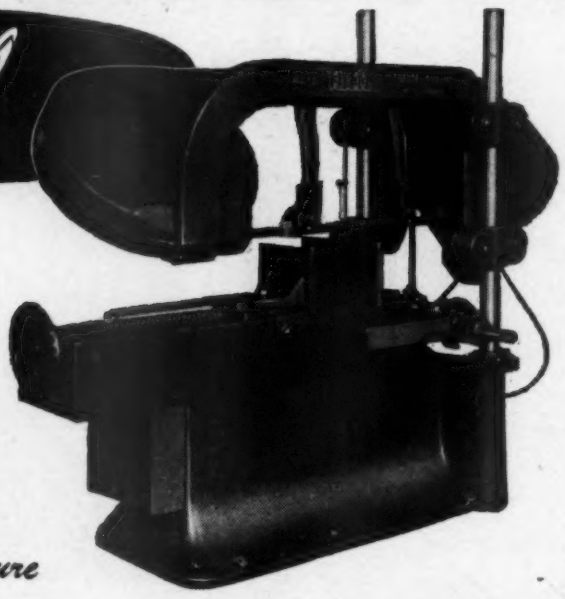

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vacations, the employer stated he intended to continue these benefits. The employees were urged to judge for themselves where their individual welfare lay, and were advised that the election gave them an opportunity to decide whether to continue their lot with proved responsible management or cast it with irresponsible outside labor organizations. In a letter dated four days before the election, the employer expressed his view that he did not believe any radical departure from the present course would preserve the mutual benefits they have all worked together to achieve.

Supervisors' conduct which included (1) stating that if the union won the election there would be a strike within 30 days; (2) questioning an employee how he felt about the coming election; (3) advising another employee, after pointing out the advantage of dealing directly with the employer, "to get on the right side of the fence and go out and plug," was not coercive.

The fact that the employer supplied transportation to the polls for a number of employees did not interfere with the election in absence of a showing that this service was rendered exclusively to non-union employees, or that the supervisors driving the automobiles were guilty of any improper action, or that they otherwise attempted in influence the employees in the election. (Hercules Motors Corporation and International Union, United Automobile, Aircraft, & Agricultural Implement Workers of America)

Statements to the union made by a general manager at the time of its request to bargain that he did not know whether he wanted the charging union in the plant, and that he wanted to consult with a rival union, must be discounted in view of his statement immediately thereafter in which he expressed a willingness to meet with the union without any unlawful qualification. The general manager's participation in the preparation of employee affidavits repudiating the union, and the superintendent's statement threatening reprisal for union membership, were not sufficient to constitute bad faith, since the general manager's conduct, which occurred 5 months after the union's request for a conference and the employer's reply thereto, is insubstantial support for a finding that the reply was made in bad faith. Furthermore, the superintendent's statement was not part of any plan of interference by the employer. (Keith Furnace Company and United Production & Service Employees)

***MANAGEMENT'S RIGHT TO GRANT WAGE INCREASE**

An employer is guilty of an unfair labor practice when he unilaterally grants a general wage increase while bargaining negotiations are in progress. After having rejected the union's proposal for an immediate wage increase based on increased production, the employer refused to discuss further the union's request for a wage increase until they

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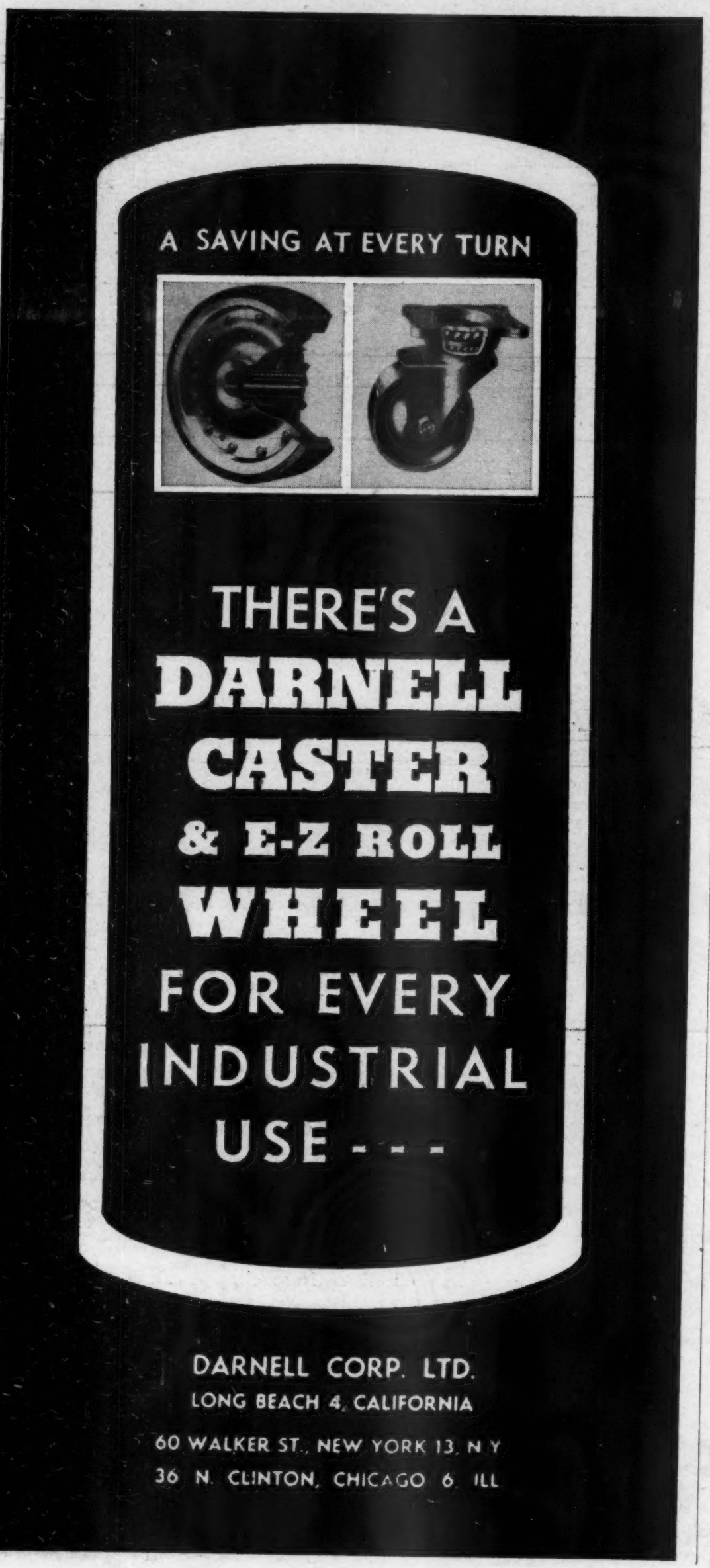

both agreed on all other terms of the contract, and then not only failed to wait, but also put into effect the type of wage increase that he had announced during negotiations he would not grant. The employer was under a duty to bargain as to wages, and the union's rejection of his suggestion of an immediate wage increase as part of an incentive pay plan did not end that duty. In the absence of an impasse, genuine collective bargaining required that the employer continue to negotiate with respect to wages before taking further action thereon. (Southshore Packing Corporation and AFL; NLRB)

An employer may unilaterally grant merit pay increases to selected individual employees while bargaining negotiations are in progress, where it can be established that the employer had a policy of granting such merit increases before the union began to organize the employees. (Southshore Packing Corporation and AFL; NLRB)

***MANAGEMENT'S RIGHT TO MAINTAIN EFFICIENCY**

An employer was not exercising his right to discipline employees, which under the contract is subject to review, when he placed two foremen on probation for 90 days and docked them 1 hour's pay as penalty for their failure to prevent excessive loafing on the job. Since the evidence disclosed no indication of violation of any order or rule, commission of any personal misconduct, or offensive conduct, the employer's action was not disciplinary but was merely taken to maintain order and efficiency. By the terms of the agreement, the right to maintain order and efficiency is vested solely in the company. (In re arbitration between Ford Motor Company and Foreman's Association of America)

***MANAGEMENT'S RIGHTS DURING A STRIKE**

An employer may refuse to reinstate strikers who struck in violation of a collective bargaining agreement when the strike was not caused by an unfair labor practice, since the discharge was intended to effect a permanent termination of the employer-employee relationship. An employer also has the right to insert advertisements in the newspaper and to send letters to all strikers, urging them to demand a secret ballot on the question of returning to work and offering an advance against future pay checks to those who returned to work. By his actions the employer did not interfere with, restrain, or coerce his employees in the exercise of their rights. The employer, in his attempts to terminate the strike, expressly disavowed to the strikers any attempt to induce them to repudiate the union, as evidenced by his letter to the employees in which he stated, "We are not trying to break the union since we believe in the principle of collective bargaining, we do not intend to abandon our attempt to bargain in mutual good faith with the union." (Fafnir Bearing Company and Local 133,

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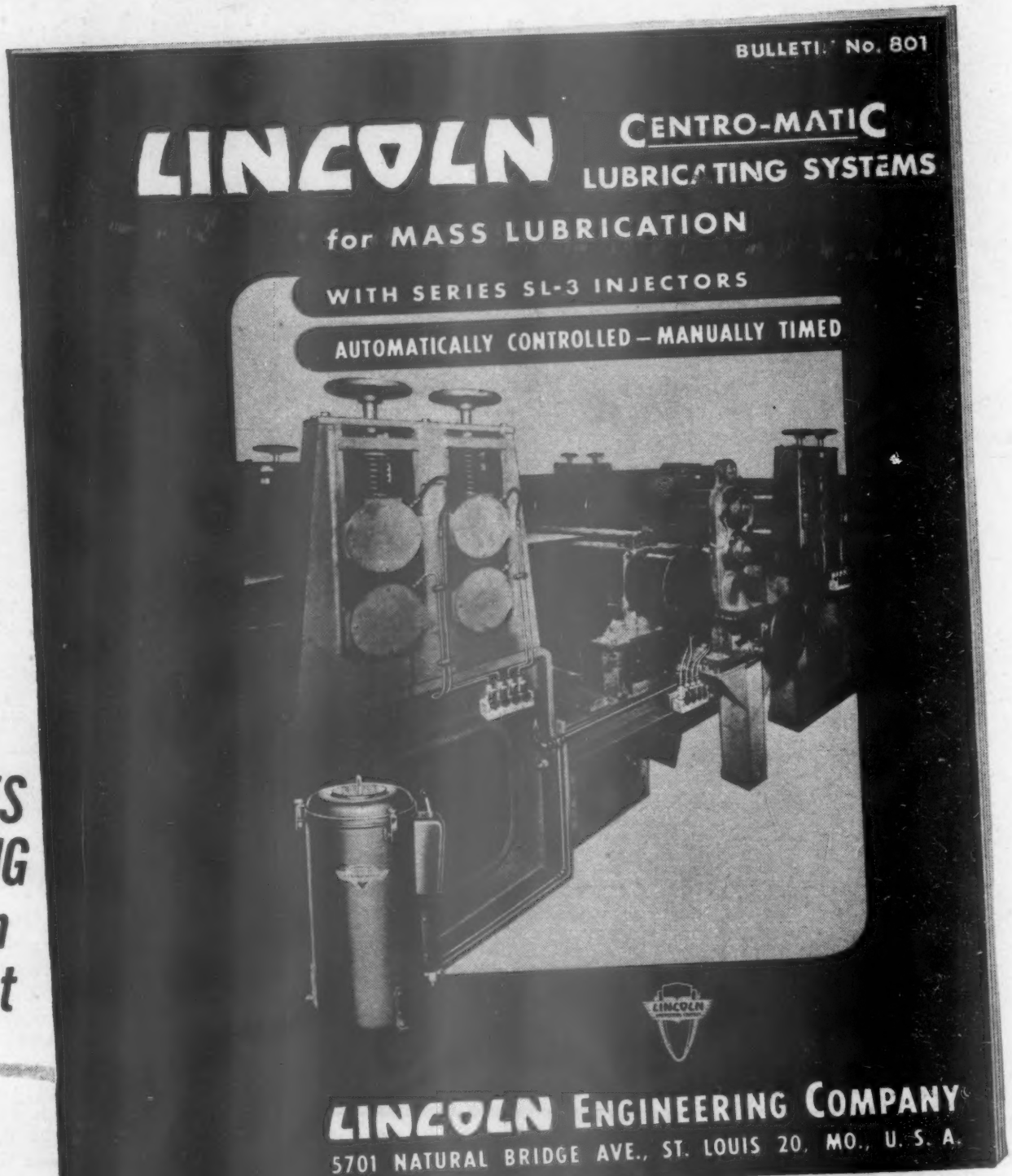
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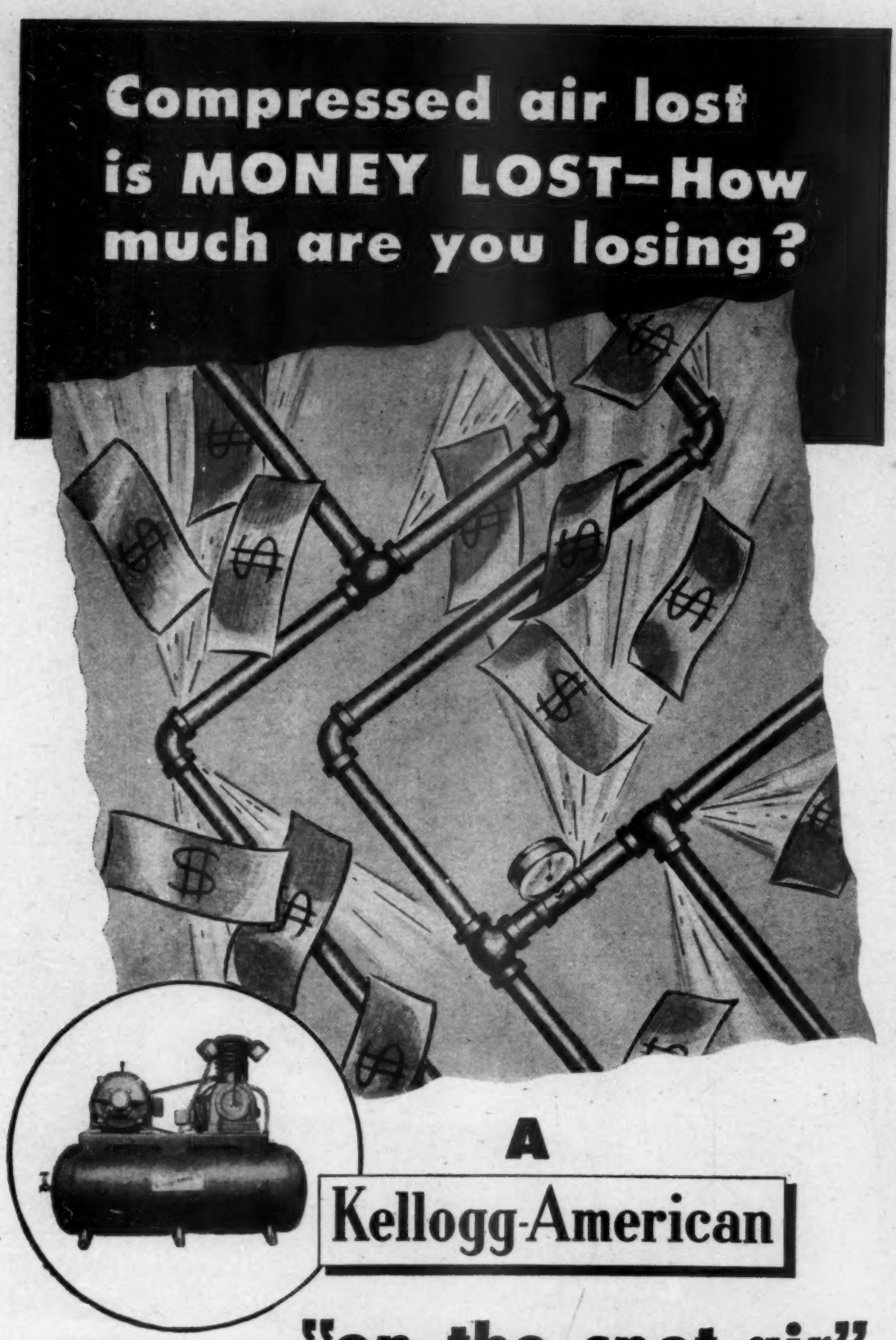

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***REFUSAL TO FURNISH RECORDS DOES NOT CONSTITUTE REFUSAL TO BARGAIN**

An employer who failed to furnish records of wages paid to employees since 1941, as requested by the union during bargaining negotiations which lasted from August to October, and who was reluctant to submit definite counter-proposals in relation to wages, is not guilty of refusal to bargain. The obligation to bargain with the accredited representatives of his employees, which is imposed upon an employer by the State Labor Relations Law, does not require that an agreement be reached. The company had offered to negotiate a contract on the basis of vacation and holiday pay, but not wage increases, contending that it had raised wages to meet the increased cost of living. When the union insisted that it was "standing pat," the company stated it had no counterproposal to offer, and the union filed charges. The company never refused to negotiate as indicated by the fact that it sent a letter to the union stating that it was willing to resume negotiations after the filing of charges in the case. (Cadillac Automobile Company of Boston and International Association of Machinists; Mass Labor Relations Commission)

NLRB MAY NOT ORDER EMPLOYER TO VOID CONTRACT

The National Labor Relations Board may not order an employer to cease from effectuating its contract with an inside union, predicated on findings that after the union was certified and the contract was executed the employer engaged in an unfair labor practice of giving assistance to a union but not of dominating it. Such an order by the board would be revoked, since there is no relation between the contract and the unfair labor practice, and it would thwart the policy of the Act. The employees had the right to designate the independent as their bargaining agent. The board had issued its certificate and it became incumbent upon the employer to recognize the independent as the representative of his employees. The authority to order affirmative action does not go so far as to confer a punitive jurisdiction enabling the board to inflict upon the employer any penalty it may choose because he is engaged in unfair labor practices. In the instant case there is no relation between the alleged unfair labor practices of the company and its contract with its employees. (NLRB v. Scullin Steel Company; CCA-8)

***EMPLOYEE WHO REFUSES TO JOIN A UNION MAY NOT BE DISCHARGED**

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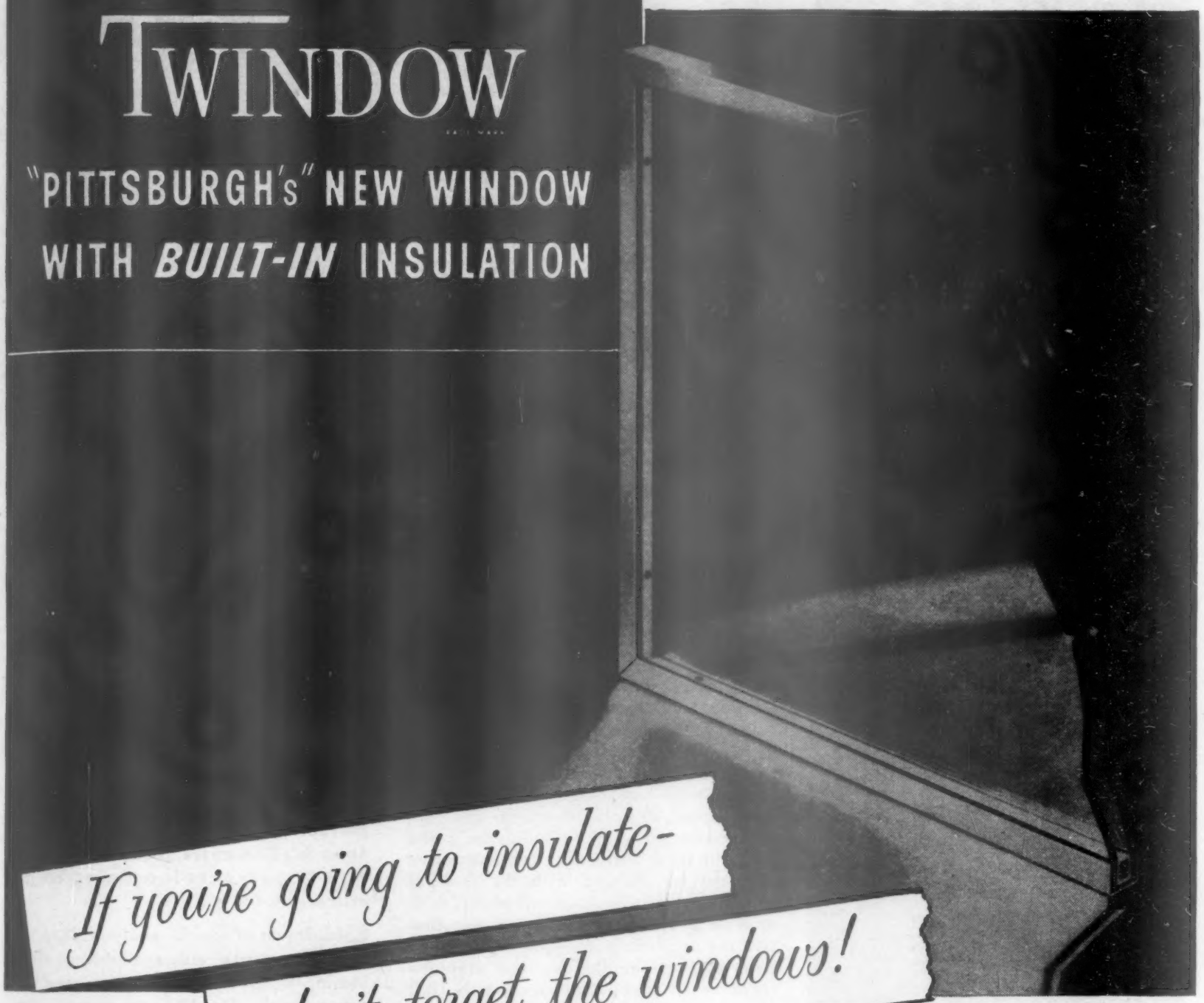

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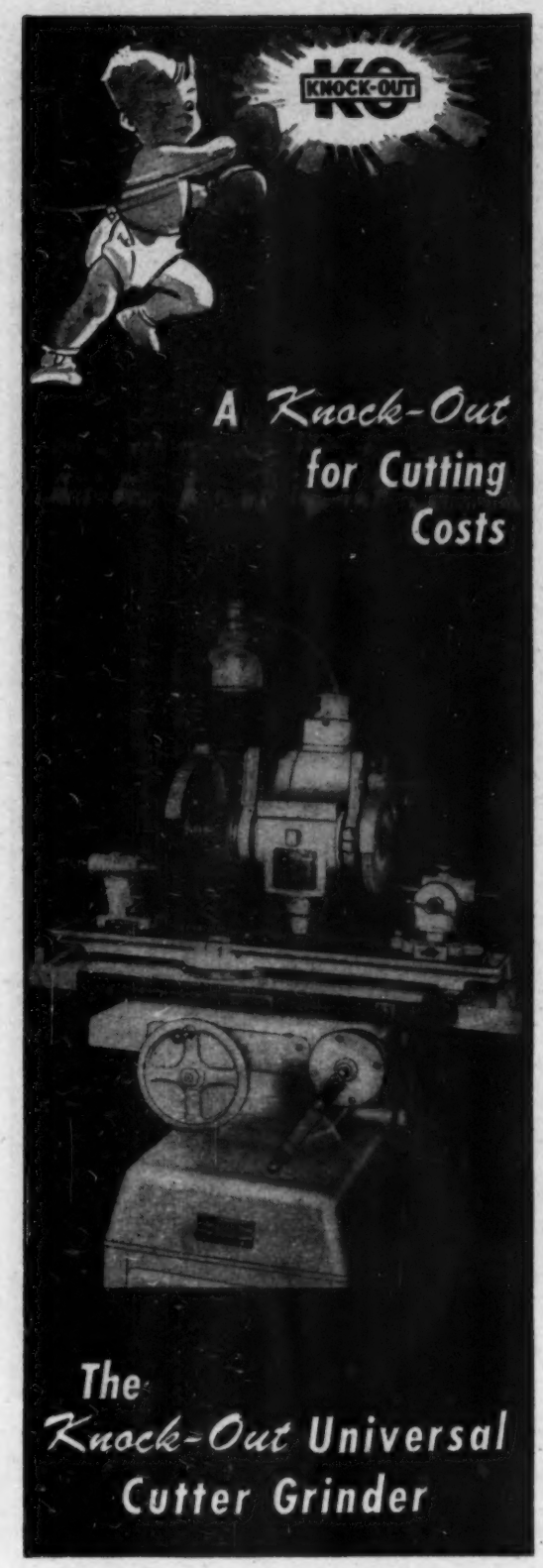

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which was the lawfully designated bargaining agent but which had no closed shop contract with the employer. An employer is guilty of an unfair labor practice when he discharges under those circumstances, since in the absence of a closed shop agreement an employee can not be compelled to join the union. In the absence of any agreement, the encouragement of organization is an unfair labor practice. To coerce or force an employee to join a union, in the absence of a closed or union shop agreement with a lawful union, is to encourage membership therein. (NLRB v. American Car & Foundry Company; CCA-7)

***EMPLOYEES NOT ENTITLED TO INJUNCTION**

Employees who are not members of a closed union which is under contract with the employees, but who were employed when the union was unable to furnish other employees, may be discharged because the union is training members to take over their jobs. Employees threatened with discharge are not entitled to an injunction on the theory that the "union, as their bargaining agent, may not do acts which will result in their discharge," since the court has no control over membership of a union. It is the law of the state that the courts have no control of the membership of labor unions and that persons may be excluded therefrom without reason or for any reason other than race, color, creed, or national origin. The employees contend that, although the union which is their bargaining representative may not be charged with the duty of admitting them to its membership, it is at least prevented from doing acts that will result in their discharge. The court held that the employees took employment with the employer with full knowledge of the situation. (Clark v. Curtis; N. Y. Supreme Court, Nassau County)

***UNION OFFICIALS NOT LIABLE FOR UNAUTHORIZED WORK STOPPAGE**

An employer may not hold a union liable for damages he suffered during a work stoppage when the work stoppage was not authorized or sanctioned by the union officials. The fact that the union members participated in the strike in violation of the no-strike clause of the contract does not make the union liable, since the union is an entity recognized by law and as such is not responsible for unlawful acts of individual members where there is no proof that the union promoted or authorized such acts. The work stoppage was not occasioned by any dispute between the petitioner and the union, it was the result of an intra-union dispute. The stoppage had not been ordered or sanctioned by the officers of the union; the members acted on their own initiative. In fact, the unauthorized action of the members was promptly repudiated by the union in its monthly bulletins in which they referred to the stoppage as "an illegal and unauthorized stoppage of work." (Motor Haulage

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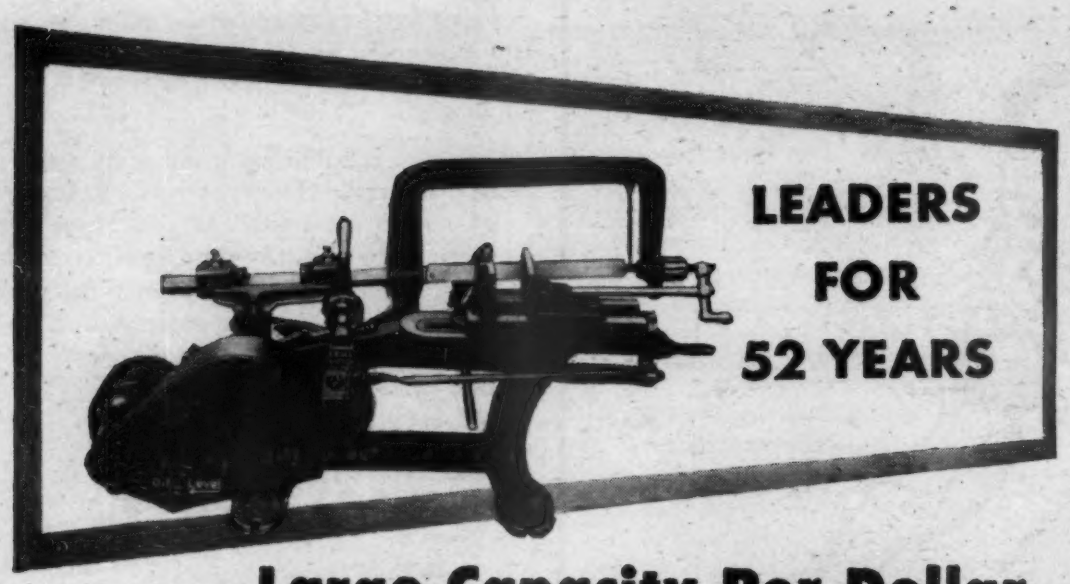

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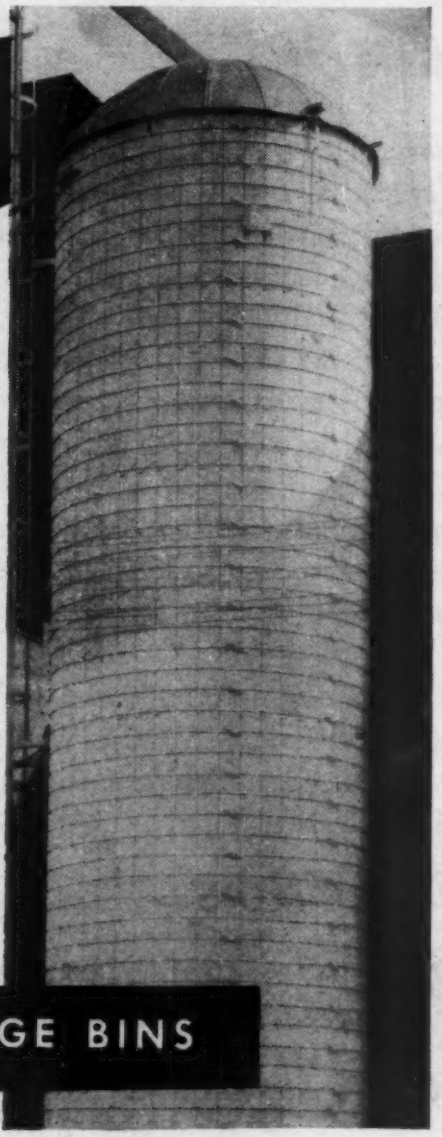

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Company v. Teamsters Union; N. Y. Supreme Court, Special Term, Part I, New York County)

*USAGE AND CUSTOM MAY NOT CHANGE CONTRACT

Where the contract provides for reinstatement of employees who have been on a leave of absence, not exceeding six months, due to illness, an employer may not further condition reinstatement upon "physical fitness" certification, despite the fact that practice is one of many years' standing.

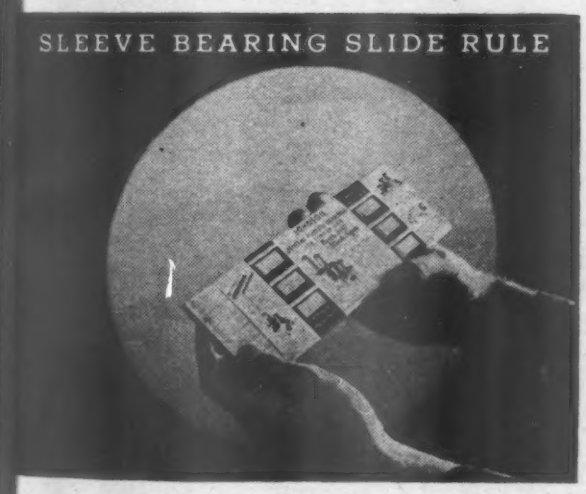
Although the employer's practice of requiring releases from the company's medical staff before returning to work after an authorized absence of more than four days has been in effect at the company's plant since 1937, it was never discussed at the time the contract was negotiated. The rule regarding the role of usage and custom in connection with the construction or interpretation of written contracts, is that usage and custom may be proved in explanation and qualification of the terms of a contract which otherwise would be ambiguous, or to demonstrate that the language appearing in the contract was used in a particular sense different from that which it ordinarily imports, but such evidence is never admitted to make a new contract or to add a new element to one previously made. Evidence of usage and custom is not permissible to restrict or enlarge the explicit terms of the contract or to control the apparent intentions of the parties. To permit the company now to add to or supplement the provisions of the contract so as to embrace an additional requirement through the introduction of evidence of a prior usage and custom of this character would require the arbitrator to disregard the well-established principle of contract construction. (In re arbitration between Inspiration Consolidated Copper Company and International Union of Mine, Mill, & Smelter Workers)

SEVERANCE DOES NOT MEAN DEMOTION

Under contract clause which reads—"upon the termination of services of a salaried foreman by the company, the foreman will receive two weeks' regular pay after the date of termination of services," foreman is entitled to severance pay only when a complete discontinuance of the employment relationship takes place and not when he is demoted to a production worker's job. Termination of services, as used in the contract, means complete discontinuance of the relationship of employer and employee and does not mean a mere change in the position enjoyed by the employee among his fellow-employees. Since employee's demotion merely changed his position from foreman to heavy press operator without interruption of the continuity of his employee status, his services were not terminated by the company. (In re arbitration between Ford Motor Company and Foreman's Association of America)

Stock Size

Bronze Bearings



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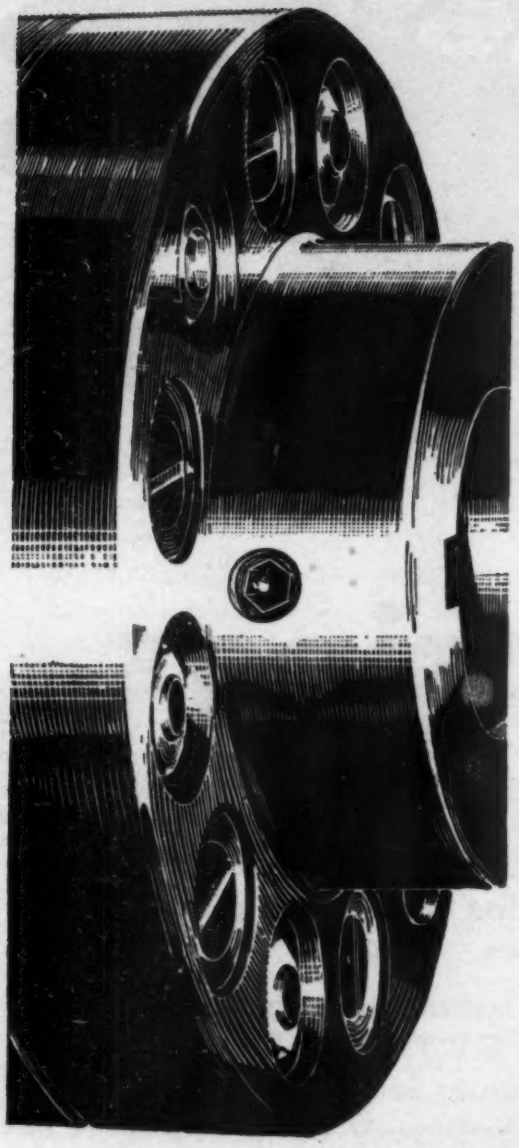

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A LABOR LEADER'S VIEWS ON THE RIGHTS OF LABOR

The following testimony—reproduced in part—was given by Maurice R. Franks, National business agent and editor of the Railroad Yardmasters of North America, Inc., in response to questioning before the Committee on Education and Labor for the House of Representatives. The questioning followed a prepared statement which Franks read before the Committee in connection with hearings held for the purpose of helping legislators in the preparation of new labor laws.

McCowen (Ohio). We shall now proceed with the questions. Mr. Schwabe.

Schwabe (Missouri). I should like for you to tell just a bit more about your position and the organization that you represent.

Franks. Well, the yardmasters' organization, as a matter of fact the occupation of yardmaster, is a very limited one. There are about 5000 yardmasters in the United States, represented by two separate and distinct organizations; one, the Railroad Yardmasters of America, and ours, the Railroad Yardmasters of North America, Inc. The membership is pretty evenly divided.

Schwabe. Yours, however, is an independent union, where otherwise the other one is affiliated.

Franks. A recent affiliation for the other one, the last month or two. Ours is independent.

Schwabe. I notice that you say something about permitting only citizens of the United States and of its possessions the privilege of negotiating matters pertaining to industrial relations.

How did you happen to put that provision in your recommendations?

Franks. I shall be very happy to answer that. I myself am not native born. I was born in Ireland in 1899. I came from a poor family. If I had stayed in Ireland, I possibly should never have had an opportunity for advancement.

I came to this country at the age of seven. I have seen the opportunities that can be attained only under such a system as ours. . . . If a business or labor leader does not have strong allegiance to our system, there may be a chance that he has allegiance to another system that may be contrary and highly detrimental t our own.

And that is one reason I say tha any man who does not think enoug of this country to become a citizen o it, to swear allegiance to it, is not fit or a safe man to be heading any thing in this country that has to d with industrial relations.

Schwabe. That is, to be an office or one permitted to negotiate.

Franks. That is right.

Schwabe. You have given us som suggestions here that I think th committee would do well to study

Would you say that the thing w should do in writing what you woul term "Industrial Relations Act"—an I like that term—would you say tha the thing to do is simply to recogniz the workers' right to organize? Is tha the principal part of the bill that yo would suggest to Congress?

Franks. I think it is accepted tha they have the right to organize. Tha is the one part of the Wagner Act tha we can understand—that employees have the right to organize. But it has not told how.

The Act says employees have a right to organize by means of thei own choosing, but an employee doe not have the right to assert his ow choice. The fact that employees hav the right to organize, I think has bee accepted. *How* is another point tha you must determine.

Gwinn (New York). You sai some rather rough things in you statement about the closed shop. wonder what you think of man union leaders' positions that fre riders ought not to be permitted in factory.

Franks. Well, Congressma Gwinn, it all depends on how yo look at it. I do not see how any ma could be taking a free ride on a vehi cle going in the opposite directio from his desired destination. If a ma cannot see the value, and he canno be sold the value, of unionism, wh should it be forced down his throat Why is it a free ride? . . . It is a bi question, Congressman, whether worker is riding free or not. When a union establishes a maximum earning for a man, as in the case of a bricklayer, that he can lay only so many bricks per day, at so much, even though he is able to lay twice as

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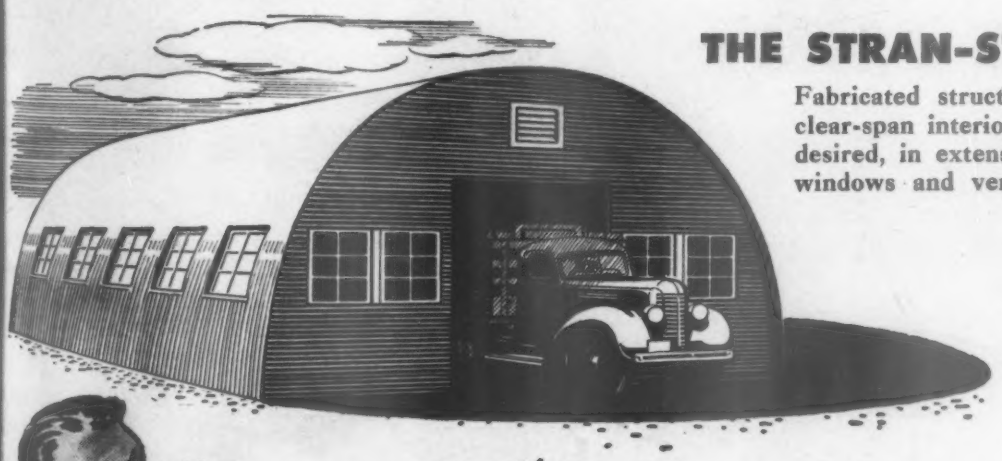

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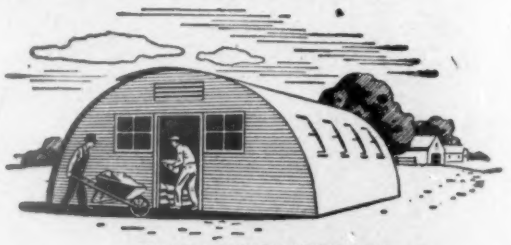

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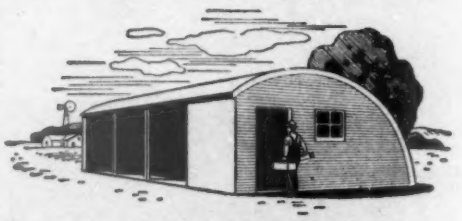

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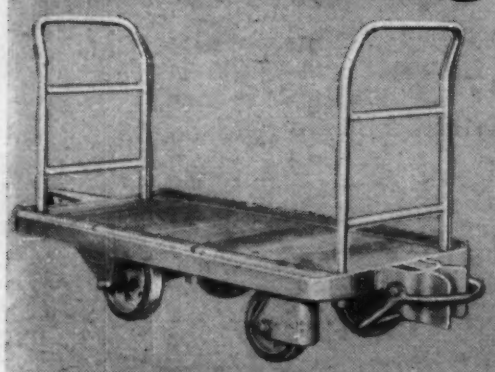

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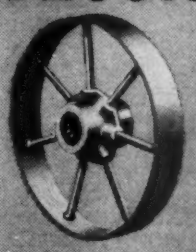
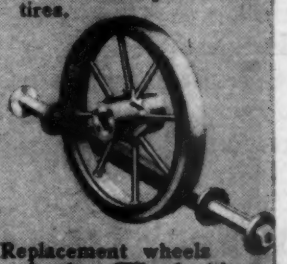


Wheels with steel tires.

Wheels with pneumatic tires.



Replacement wheels and axles. (Wheel with molded-on tire illustrated.)

ELECTRIC WHEEL CO., Quincy, Illinois, Est. 1890

many, he is not taking any free ride. He is being taken for a ride of the closed shop. . . .

Gwinn. There has been an intimation here that one of the worst of the closed-shop situations in the country is the union of the American Newspaper Guild, which has to do with the dissemination of truth through the free press. I take it you not only work in your union, but you also publish a paper and write some for other papers. Is that right?

Franks. I edit the official organ of our organization, which is known as the *Railroad Workers Journal.*

Gwinn. Have you had any experience with the closed shop of the American Newspaper Guild that would help in this inquiry?

Franks. Well, I have never been a member of the American Newspaper Guild. If the Guild operates as a union under the closed shop, it is in no different position from any other union, and as such can play a very derogatory role in influencing any newspaperman as to what he should or should not write, as in the case, we shall say, that the Guild itself did something.

If as a newspaperman and a member under the closed shop, the member were to report something highly detrimental to the Guild, he could be cited for it.

Gwinn. You mean he could be fired?

Franks. He could be fired and under the closed shop he would lose his job as a newspaperman . . . in my estimation a man in that position in the American Newspaper Guild, or any such other union, is nothing more than a bird in a "Guilded" cage.

Does that answer your question?

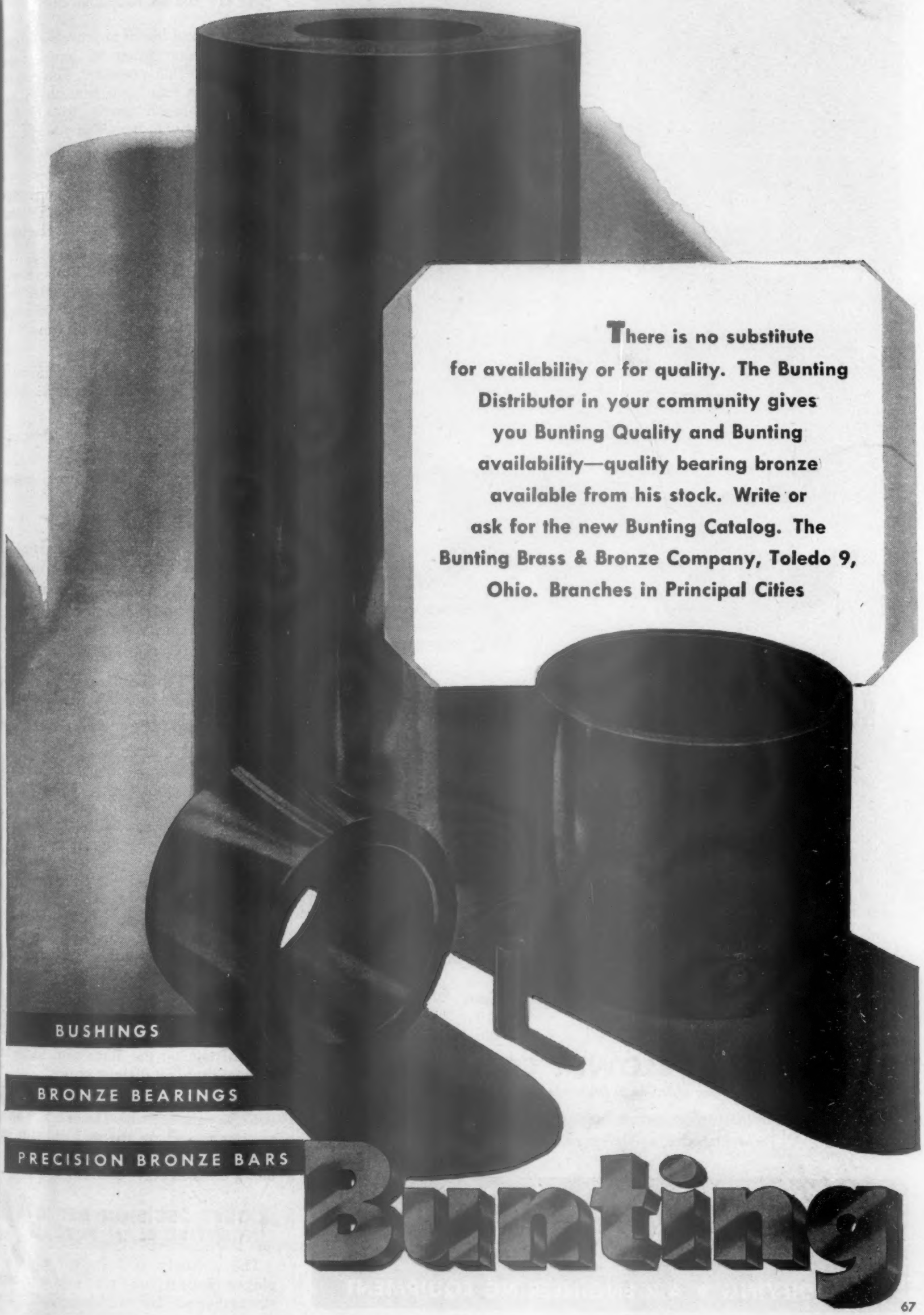
Gwinn. Thank you very much. I think it does.

I might ask this: Do you think that our news is colored, and how can it be colored?

Franks. I have had quite a bit of experience in that, and I can almost see in the papers tomorrow what I have said here today. If a Guild man writes the report, there will not be one thing that I have said in favor of organized labor, but anything that I said that may not be complimentary will appear.

Buck (New York). Do you feel that in the interest of the 140,000,000 people of this country that one particular craft should be permitted to strangle the nation's economy?

Franks. Congressman, on any such question, when it is presented to



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the rank and file of any organization you are not going to have many strikes in this country. The whole proposition has been that there has been too much power in too few hands, that the rank and file do not get an opportunity as rank-and-file members to voice their opinion.

Buck. Then I take it that your suggestions about the secret strike vote would be your answer to that question.

Franks. That is right. There is one thing stronger than all labor leaders put together, and that is public opinion. The rank and file help constitute that too.

Buck. To go into the strike vote for a moment, who should participate in the vote?

Franks. Those who would be affected by the strike.

Buck. Both union and non-union members?

Franks. Definitely.

Buck. And should the determination be by a majority of all affected?

Franks. By a majority of all those affected. I should say at least a 66⅔ per cent majority.

Buck. Why that majority?

Franks. I think it is safer. I do not think it can be fooled with.

Buck. How do you feel about mass picketing?

Franks. When you get into a mass picketing, and you put 5000 men in front of a gate or in front of a plant, that is not accomplishing anything. It is only accomplishing mob hysteria, mob hatred. Five men or two men could tell the world that the place was on strike.

I am not in favor of mass picketing. I am not in favor of saying the employer has been unfair until he has been proved unfair.

Smith (Kansas). Is it your thought that an industrial relations court should be put in the hands of our federal courts, the state and federal courts; that is a district court?

Franks. I believe your federal court is your answer. There is not any politics mixed up there. I am not in favor of industrial relations cases being tried in state courts.

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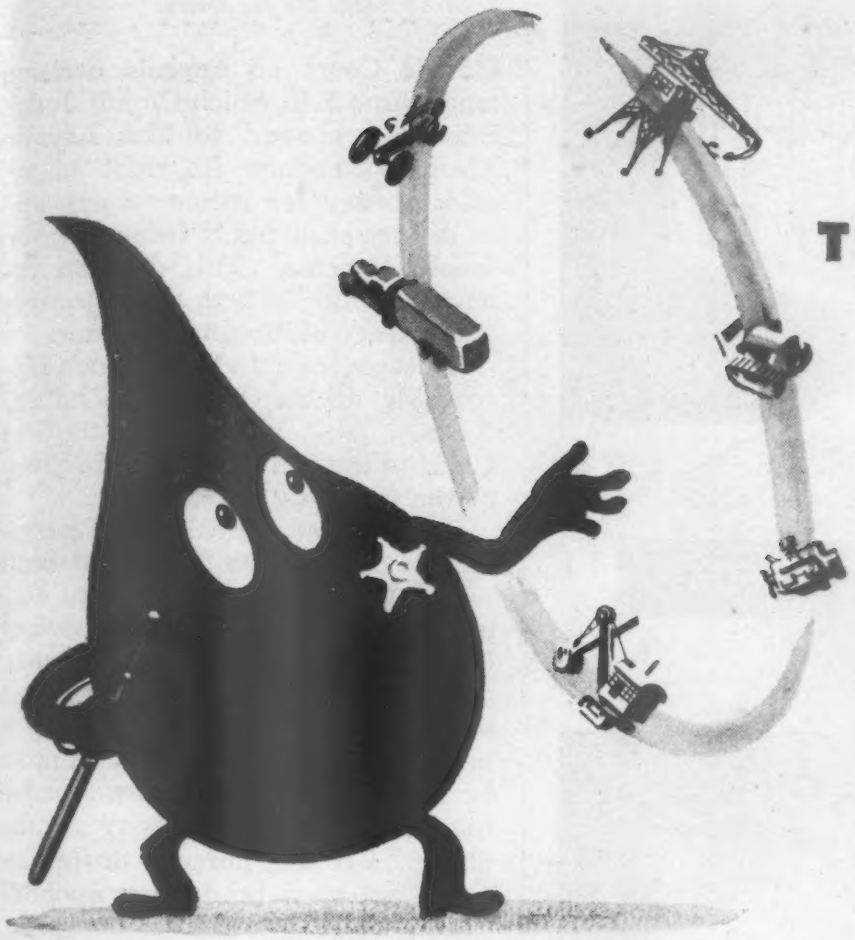

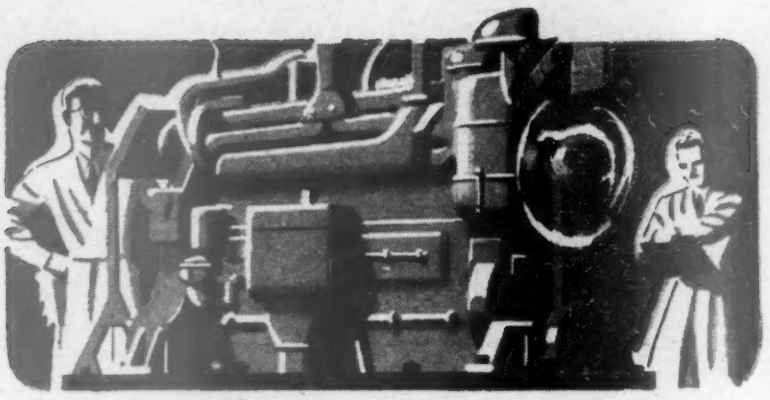

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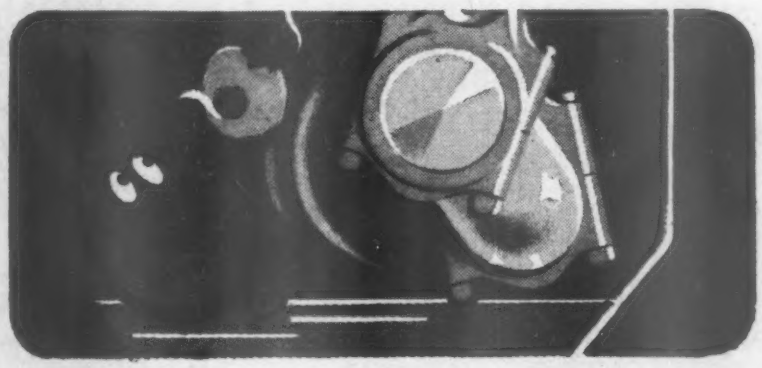

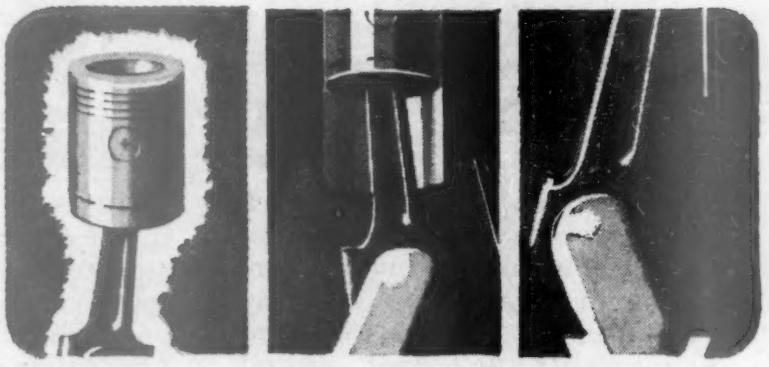

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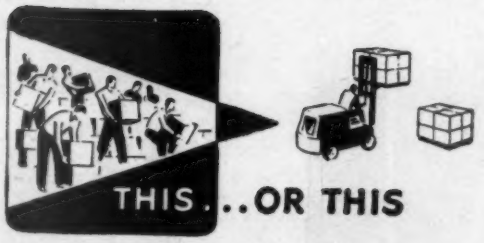

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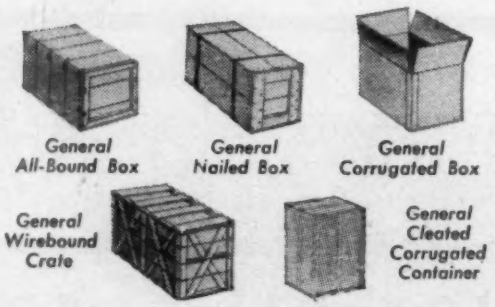

ECONOMIZE . . . PALLETIZE . . . GENERALIZE!

Circuit Court of Appeals decision made June 5, in which Circuit Judge Simons restored to The Lincoln Electric Company its right to set aside money for incentive pay and to deduct such funds from reported taxable income. This decision reaffirms a faith in both the objectives and efficacy of incentive systems.

Excerpts from Judge Simons's far-reaching decision, in which he reversed a previous finding of the Tax Court of the United States, are given in the following paragraphs:

The Tax Court proclaimed its conviction that the petitioner had built up a loyal and efficient force of employees, which was an important factor in the success of its business, and that undoubtedly the preservation of that condition would be a benefit to it in the future. . . It must be noted first that there was more than a strain of constancy in the plan. . . It was pursued during an era when mass production methods were developing at incredible speed, when the best engineering brains in industry were dedicated to improvement in tools and machines, and when labor was becoming conscious of some claim to the results of labor-saving devices and increasingly vocal in demand for greater remuneration and shorter hours. It was a period of labor unrest and the petitioner was not alone in seeking means to inspire in its labor force that spirit of loyalty, efficiency, and cooperation that should avoid labor strife.

The Tax Court, on another phase of the controversy, observed that the benefit to employees was uncertain, indefinite, and so illusory that the taxpayer in fact retained the substance and granted only the shadow to its employees. But old age security and benefits to one's family upon death, even with control of distribution lodged in a committee, are not illusory. Provisions for old age security and unemployment insurance have in recent years challenged the best thought of the nation—they have enlisted the support of government itself.

Loyalty and Efficiency

The Tax Court reasoned also that the loyalty and efficiency generated among the employees of the petitioner by its incentive plan already existed at the end of 1939, and that in the face of this fact and the prospective impact of high tax rates upon current large profits, the large additional disbursements in the tax years were not necessary to preserve such loyalty

May I Count You In?

You're sure to click with this headwaiter—because he clicks you in with a Veeder-Root Hand Tally. Why so? Well, that handy little gadget helps him to keep the club's capacity within the local laws, to anticipate table-vacancies, to keep tabs on waiters . . . and to keep tabs on *you!* All very simple and unobtrusive. And *very* good business.

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and efficiency. This is a novel application to a situation in which psychological factors, group loyalties, and business judgment are elements of the old economic law of diminishing returns. The uncontradicted evidence of the phenomenal growth of the taxpayer's activity, bringing in its wake not only greater profits to itself and its stockholders, increased remuneration to its employees, and a reduction in the price of its product, destroys completely the force of the suggestion, if any it had.

Finally, it is not without importance that other incentive plans for the preservation of industrial peace may be thwarted by the decision presently reviewed, even though that ground is not the legal basis for our determination. We think that the Tax Court was in error in its interpretation of the law and that its decision should be set aside.

WESTERN STATES PASS LABOR LAWS

Several western states have recently enacted new labor laws. A survey of this legislation provides the following round-up by states:

Washington. This state's legislature passed two bills of principal interest to labor, one an anti-strike proviso in the general appropriations bill, the other allowing additional benefits to injured workmen and their dependents.

The anti-strike proviso, patterned after the measure inserted by Congress in the federal appropriations bill, applies only to workers paid out of the funds appropriated, barring them from belonging to unions which assert the right to strike against the government.

Industrial insurance laws raise the pension for injured single workmen and widows from $50 to $75 a month and for married men with a total and permanent disability from $60 to $100 a month. Also, in an action believed unique in this country, the legislature appropriated $2,250,000 a year to raise the pensions of former years to the present level.

Utah. Newly passed labor legislation in Utah prohibits the secondary boycott and other unfair labor practices; provides for a declaration of policy recognizing the interests of the public, the employee and the employer to encourage labor peace; and defines the determination of repre-

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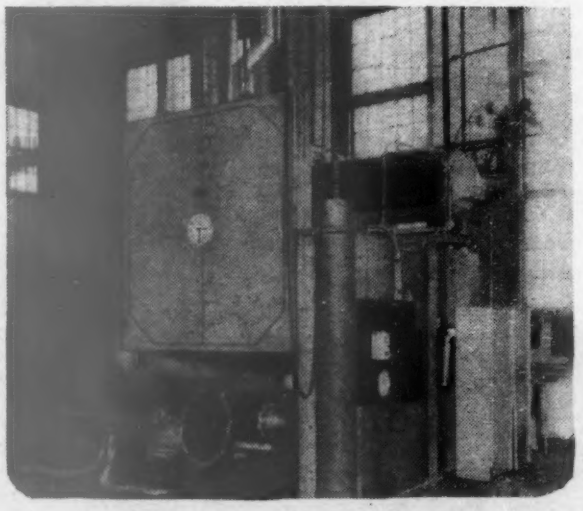
Great Northern Shops at St. Paul, Minn.

Gas-fired coil and armature oven in the electrical shops of Great Northern Railway.



Gas-fired Oven installed by Despatch Oven Co., Minneapolis, Minn.

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sentatives in a collective bargaining unit.

Amendments to the Utah Labor Relations Law, previously practically identical with the Wagner Act, permit an employer to petition for an investigation and certification of representatives where two or more labor organizations claim a majority and forbid him to bargain with representatives of less than a majority of his employees. Also employees are forbidden to coerce or intimidate fellow-employees into joining unions, submitting such acts to injunctive process instead of only regular criminal or civil proceedings.

Mass picketing is prohibited, as is mass obstruction or interference with access to or egress from any place of employment, or free use of the public streets, highways, railroads, or other means of transportation. The bill narrows the definition of "labor dispute" to include only a controversy between an employer and the majority of his employees concerning the terms of the collective agreement, the right to so bargain, and the process of bargaining itself. Thus minority strikers commit an unfair labor practice act and lose their status as employees entitled to the protections and benefits of the Act, including the right to reinstatement.

New Mexico. Chief of measures passed by this state's legislature was a proposed amendment to the state constitution to outlaw the closed shop.

Oregon. Two major bills affecting labor were passed by the Oregon legislature. One makes unlawful secondary boycotts and "hot cargoes." The other provides for secret elections among employees to determine whether a labor dispute exists.

The law making secondary boycotts unlawful prohibits labor unions from boycotting or picketing any business or industry that has no dispute with its own employees. The "hot cargo" provision prohibits unions from banning the handling of goods produced by employers who have labor disputes.

The secret election act provides that when any employee or group of employees presents demands on an employer a secret vote may be taken to determine whether a labor dispute exists justifying a strike.

Other legislation requires labor contractors to obtain licenses and post bonds; reduces from four to three years the period within which an employer may make application

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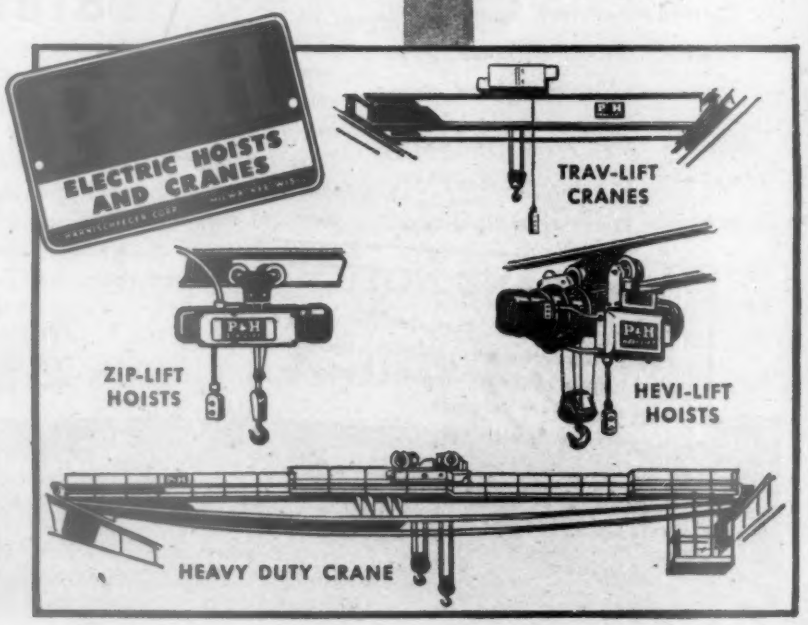

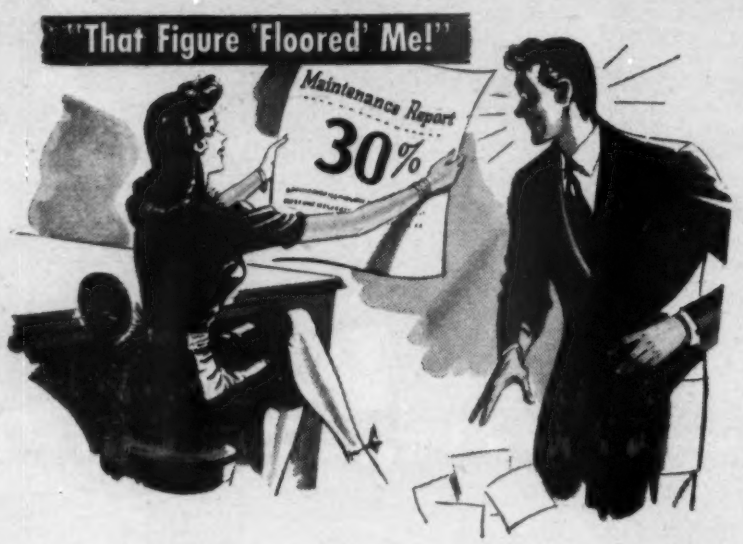

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for adjustment or refund of payments to unemployment compensation fund; limits time of action to collect wages in portal-to-portal suits to one year; prohibits discrimination by public agencies in employing by reason of race, religion, sex, or union membership.

Idaho. The Idaho legislature approved labor bills prohibiting "non-productive work wages," an anti-portal suit action, and outlawing the secondary boycott.

HOUSECLEANING FOR UNION RACKETS UNDER WAY

Union rackets will come under initial attack this summer when the House Education and Labor Committee looks into 250 alleged cases of racketeering. Findings are to become the basis of additional labor legislation in the next session of Congress, according to Rep. Fred A. Hartley, Jr. (R., N. J.), chairman of the committee, who says:

"We intend to go into every phase of this serious matter. Not only will we investigate cases of outright racketeering, but we will go also into other forms of labor abuse against which the public complains."

The probe of union rackets will deal in large part with complaints that unions charge ridiculously high iniation fees. It is reported that many times demands are made for fees as high as $500. "We have heard of one case where the fee is $1500," Hartley states.

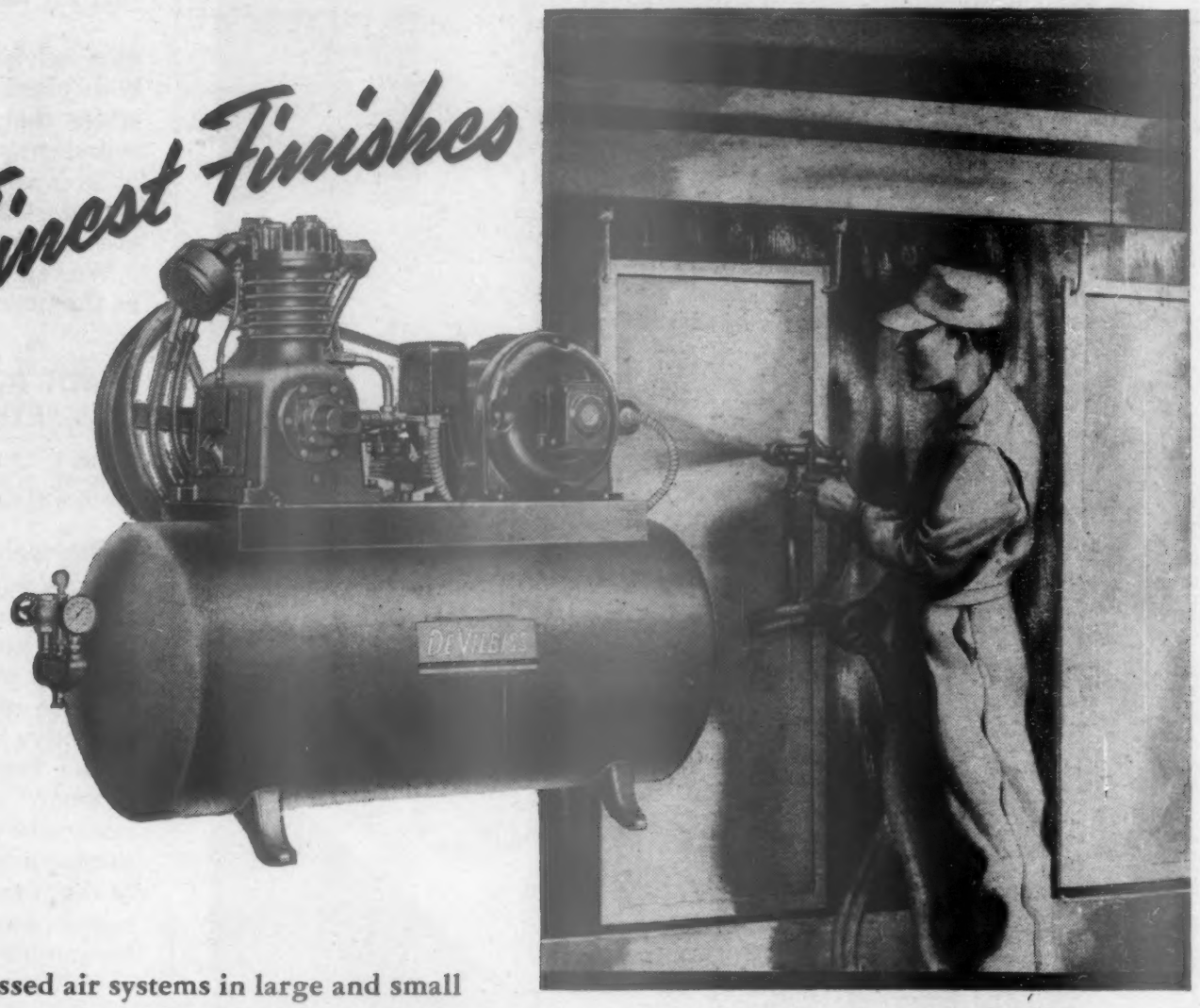
The investigation, intended to be the first comprehensive study ever taken of the subject, is backed up with compelling subpoena powers and a $50,000 fund. Evidence is already being assembled, and subcommittees will travel throughout the country in search of practices that require airing and remedial action.

NAF NOT LIMITED TO INDIVIDUAL PLANT CLUBS

In the article, "Are Foremen Really Management?", May issue, FACTORY made the statement: "Unlike NAF (National Association of Foremen), whose local clubs are usually made up of foremen and executives from individual plants, the Council (National Council of Foremen—YMCA) is made up of 'city' clubs which may have representatives of 20 or 30 different companies."

The National Association of Fore-

For the Finest Finishes



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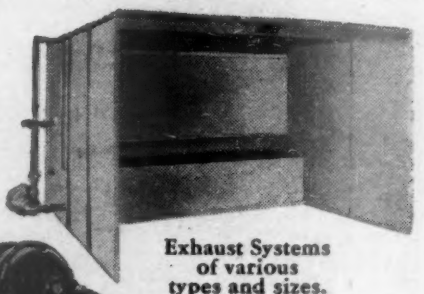

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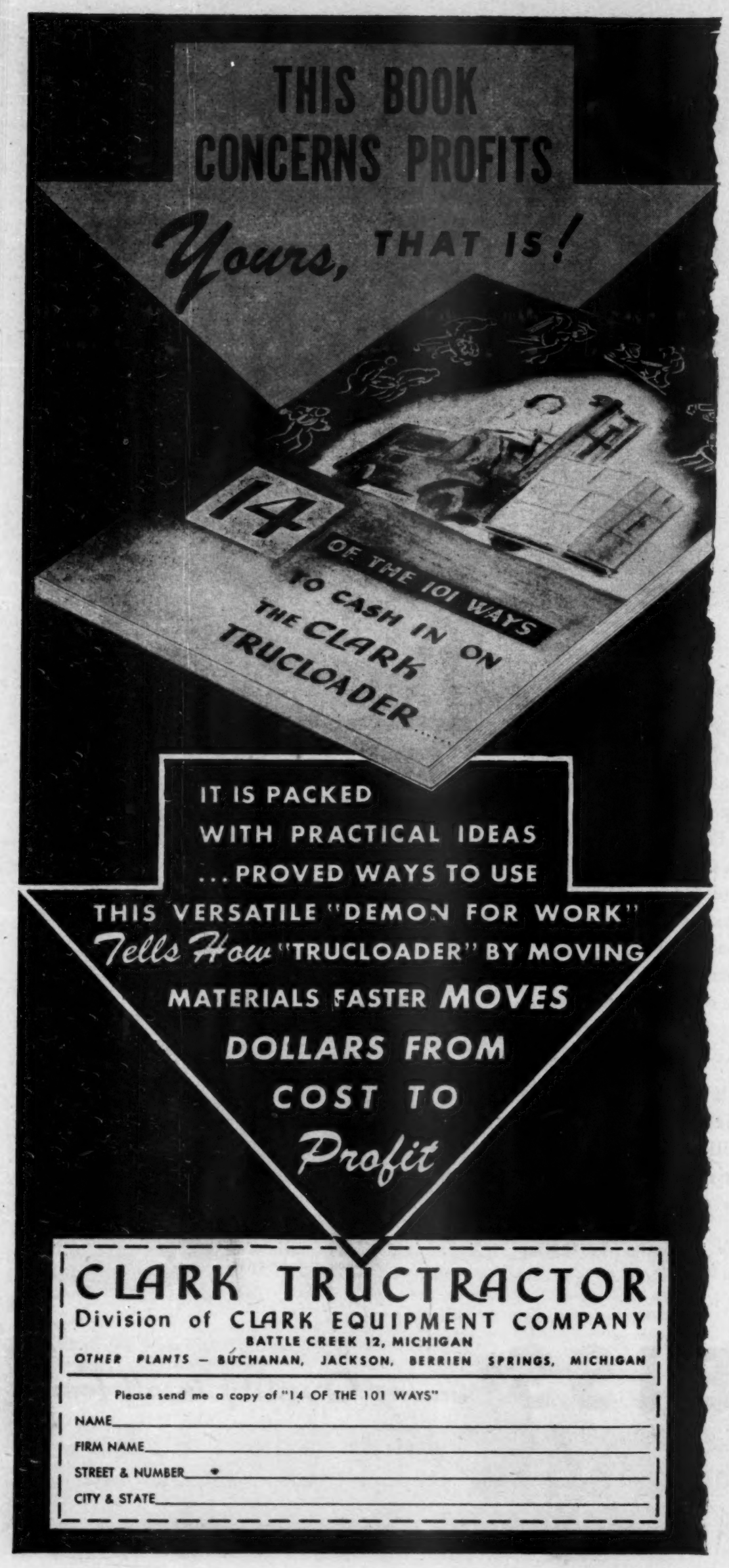

men advises us that the NAF has both plant and city-wide clubs, and states that its city clubs may have representatives from a great number of companies. It cites the club in Dayton, Ohio, in which 100 companies are represented.

We regret that the error was made in the article.

LABOR RELATIONS IN A COMPETITIVE ECONOMY

CYRUS S. CHING, Director, Industrial and Public Relations, U. S. Rubber Company, addressing the Chamber of Commerce of the United States

One would be led to suppose, after hearing some of the discussions and reading some of the edicts of governmental agencies, that business and industry were organized for the sole purpose of supporting some kind of collective bargaining system.

The function of industry in our economy is the conversion of raw materials into finished products, at proper prices, with adequate return to the investor, so that industry may better serve the public. Collective bargaining can help the management of industry in carrying out this function and, to the extent that it does, it is good. To the extent that it may disrupt, influence, or interfere with this delicate machine, then industry is hampered in its purpose and intent—and the public suffers.

I believe that we in industry must take a new approach to this whole subject of employee-employer relationships. We must get over our emotional approach and look at the subject in the same way we look at any other sales or engineering problem. Any representative of business in this room today who was planning a sales campaign would analyze the situation and analyze his market carefully. Then, if one approach failed, he would try another. If we realized that our employees constitute our market for our employee-relations ideas, we might be willing to try the same plan. However, we often approach the matter of labor relations with a fixed idea as to what is right and as to what we believe our employees' reactions should be; then if they do not willingly accept the plans and ideas we offer them, we are disappointed and inclined to get angry about it.

American industry has a responsibility today—as it always has—to sell itself to its own employees. I have said it many times before and I now repeat it—every human being is looking for something to be proud of; something he can boast about. With

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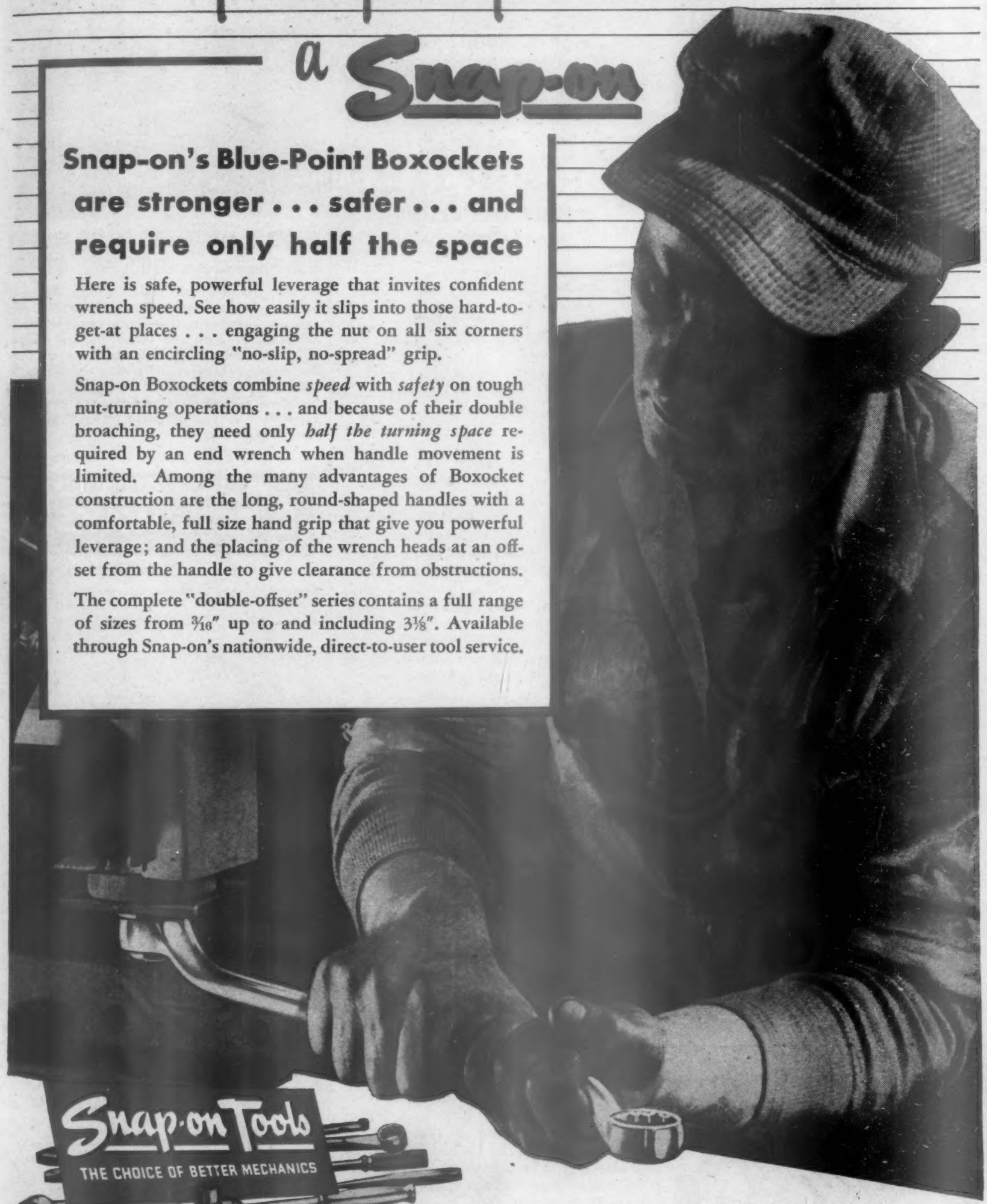
The complete "double-offset" series contains a full range of sizes from 3/16" up to and including 3 1/8". Available through Snap-on's nationwide, direct-to-user tool service.



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this in mind, can we not create a situation in our industries that will, to an extent at least, fulfill this desire? In other words, why not make it possible for our employees to boast about the company or organization with which they are connected? This is a sales problem and it has to be solved from the viewpoint of selling ideas to our employees and, through our employees, to the American public.

BEHIND THE BYLINE

Facts About FACTORY'S Authors

Hugh T. Monson (page 89) was graduated with a B.S. degree in mechanical engineering from Case School of Applied Science in 1936. Directly upon graduation he went to work for the Euclid Road Machinery Company. In eleven years of service there, he has held positions as plant engineer and factory superintendent. He is now chief industrial engineer and in this capacity directs the activities necessary to provide the plant with buildings, machinery, equipment, tooling, operation sequences and procedures, and time standards. He also takes part in the program that provides the plant with organization and personnel.

Melvin V. Haas (page 94) spent three years in Law College at Ohio State University. Then, following natural interests and aptitudes, he devoted a year to a special study of statistics under the direction of Dr. Camille Bott. Haas's first job was with P. Lorillard Company, as supervisor of district statistics, from which position he was later promoted to that of regional supervisor. After three years with this company, he returned to Ohio State University and worked with Dr. Bott as coordinator for the University and the State of Ohio in a 7-year project to codify the laws for all the cities in the state. In 1942 he joined The Globe-Wernicke Company. His hobby is collecting obsolete laws that are still in force in municipal codes because no one has ever taken the trouble to repeal them. This brings to light such oddities as a statute that prohibits more than two pigs from sleeping in a house where there is a family of five or more people. Haas has also made spare-time study of

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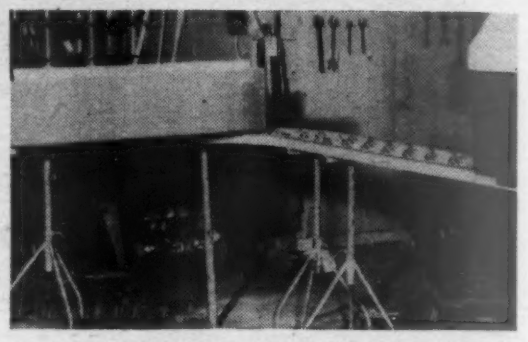

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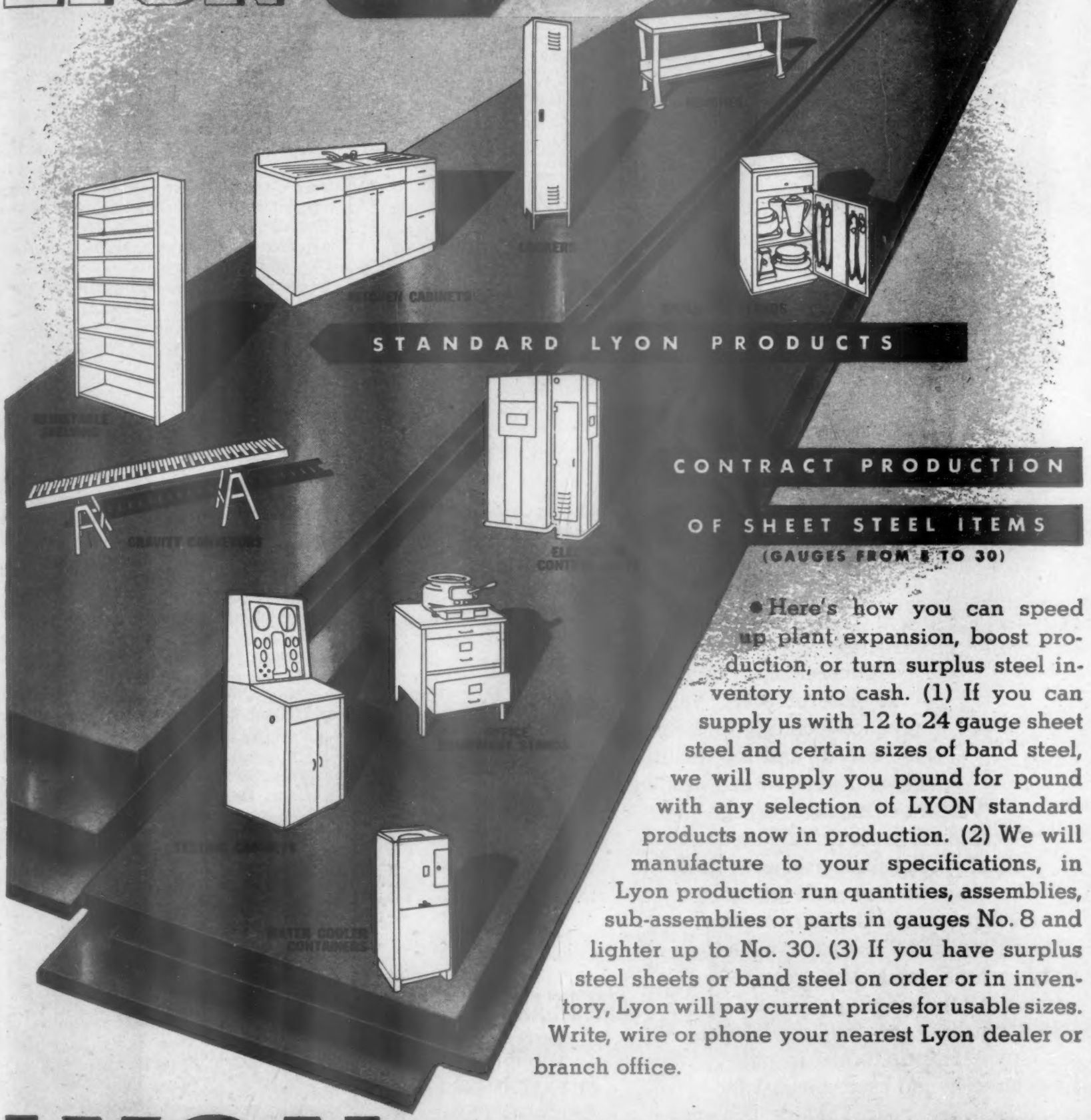

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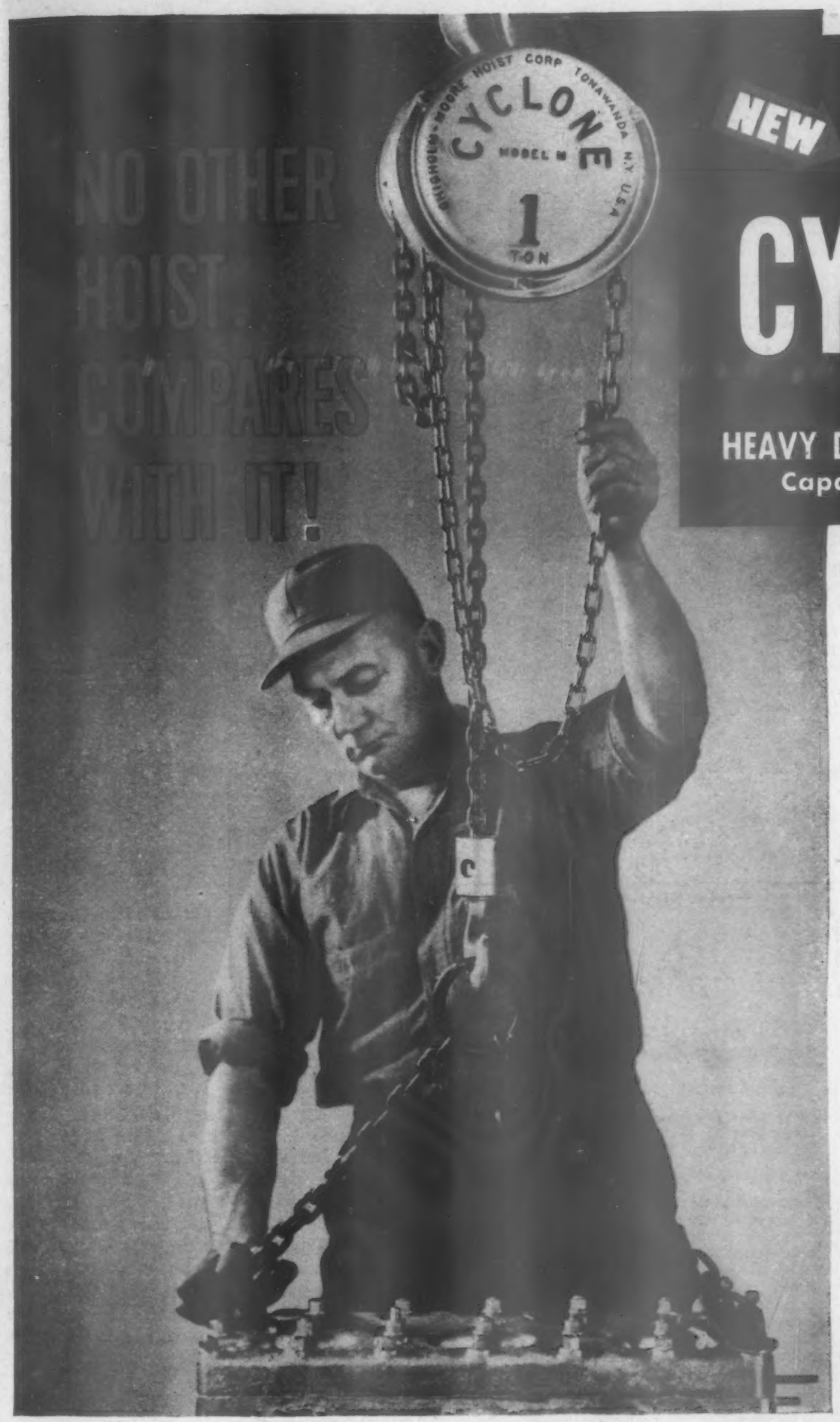
A GREAT NAME IN PAINT MAKING

towns and cities, which, because of migration, have lost their status as municipalities.

C. Fred Hedlund (page 108) received his degree in electrical engineering from Northeastern University in 1925; then was associated with his father for a short period in the electrical contracting business; and later was employed by the Gamewell Company, supervising the installation of fire alarm and police signaling systems. In 1928 he started work with the Inspection Department of the Associated Factory Mutual Fire Insurance Companies. Beginning as a regular inspector, he traveled throughout the United States and Canada. He was later appointed resident engineer in New York City and after two years was transferred to the main engineering office as a specialist in electrical fire hazards.

Robert E. Oberholtzer (page 119) is a mechanical engineering graduate of Drexel Institute of Technology. After graduation he joined James Lees & Sons Company and has been chief engineer there since 1939. He is a registered professional engineer and a member of the American Society of Mechanical Engineers and the National Society of Professional Engineers. During World War II he had five years of Army service, entering as an Infantry Captain and rising to the rank of Colonel. He served overseas and later became a member of the War Department General Staff. He is a graduate of the Infantry School, the Command and General Staff School, and the Army-Navy Staff College.

Theodore M. Walters (page 124) studied electrical and mechanical engineering through a correspondence school. He prepared himself through training and experience in the field as a machinist, pipefitter, welder, and portable engineer. He has served as a master mechanic for 16 years. His hobbies are mechanical de-



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Model M

HEAVY DUTY HIGH SPEED HOIST

Capacities from ¼ ton up

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conserves worker energy and increases productivity

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simplifies maintenance

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yet definitely a heavy duty hoist

→ **Plus SEALED-IN LIFETIME LUBRICATION**
simplifies servicing... prolongs life... maintains efficiency

→ **Plus HERC-ALLOY CHAIN**
America's First and Safest Steel Load Chain

The Cyclone Model M Heavy Duty Hoist is entirely new, completely different. Size and weight have been greatly reduced, and strength and durability greatly increased through the use of today's stronger alloys of steel and Alcoa aluminum. Efficiency and ease of operation have been increased to new high levels through the use of precision ball bearings at all rotating points. The many advantages of this unusual hoist are being demonstrated daily on-the-job by thousands of Cyclone Model M's already in service. *Ask your distributor* to show it to you.

● **New type load brake gives smooth, positive control at all times... exceptionally valuable in spotting or assembly work. Famous CM "Herc-Alloy" double duty alloy steel load chain is standard equipment on all models. The 1-ton model weighs only 35 pounds, has a minimum headroom of only 13⅜".**

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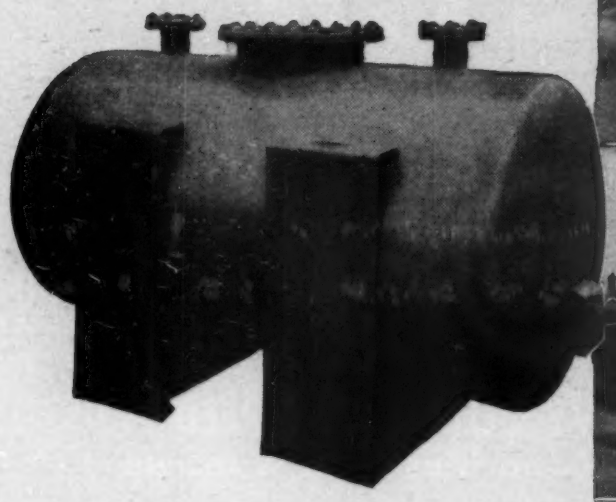
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

ONE MAN — ONE TRUCK —ANY NUMBER OF BODIES



In this installation, bodies happen to be rubber lined acid tanks. Built for any liquid or gas, in 500, 750, 1000 gal. capacities. It's the Dempster-Dumpster system of low cost materials handling - one truck hoisting unit handles any number of a dozen different types of regular or special types of bodies to suit your requirements, up to 10 cubic yards capacity. Write for catalog now.

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velopments; also hunting and fishing, and spectator sports. He is a member of the Lehigh Valley Engineers Club.

J. Manczyk (page 128) is education director for the production division of Joseph E. Seagram & Sons, Inc. He studied at the University of Berlin and went on to obtain his M.S. degree in physiology from the University of Cincinnati. In line with the Seagram personnel policy of rotation, Manczyk started as an operator in the production department; then acquired additional experience in other fields such as chemical and bacteriological work, quality control, research, and pilot plant operations. In the course of his employment, he was assigned to five different plants and thus gained an industry-wide knowledge of manufacturing methods.

William F. Pioch (page 130) began his business career in 1907 as an apprentice machinist and draftsman in his native town of Bay City, Mich. Completing his apprenticeship, he worked for several Detroit companies, becoming in the meantime a designer and maker of tools. He started with the Ford Motor Company in 1912. After a series of promotions, he became chief tool engineer. In 1943 he was appointed chief engineer at the Ford Willow Run bomber plant. At the close of the war, he assumed his present position of director of production engineering. He has written numerous papers and articles, including "Tool Shop Organization" and "What Production Engineers Would Like to Have in New Machine Tools."

William H. Wilkerson (page 135) is president and founder of The Auto-Soler Company. He is a native Georgian and was graduated from Emory University in 1925. He taught school three years; did radio broadcasting; worked in the publicity department of the Southern

No matter what size power units you need, Master Gearhead Motors are the horsesense way to use horsepower. No matter whether you use big ones or little ones, you get the RIGHT horsepower, the RIGHT shaft speed in a single unit that will fit in RIGHT where you need it. The integral construction of both motor and speed reducer into one compact unit, permits many parts to be stripped away from both the power drive and the completed machine, and pays off handsomely in savings in material . . . savings in space. In big sizes or small sizes, you'll find them easy to order, easy to use . . . a great help in securing compact, clean-cut, economical designs for your equipment.

And nowhere, except in the Master line of Gearmotors, will you find power units that are so flexible, so easily adaptable, and in such a wide range of sizes and types. They are available in any size, 100 HP and smaller . . . and for all cycles, phases and frequencies . . . in open, splash proof, totally enclosed, fan cooled and explosion proof types . . . with Speedrangers (mechanical variable speed) and Unibrakes . . . for every type mounting . . . and over a gear reduction range up to 432 to 1.

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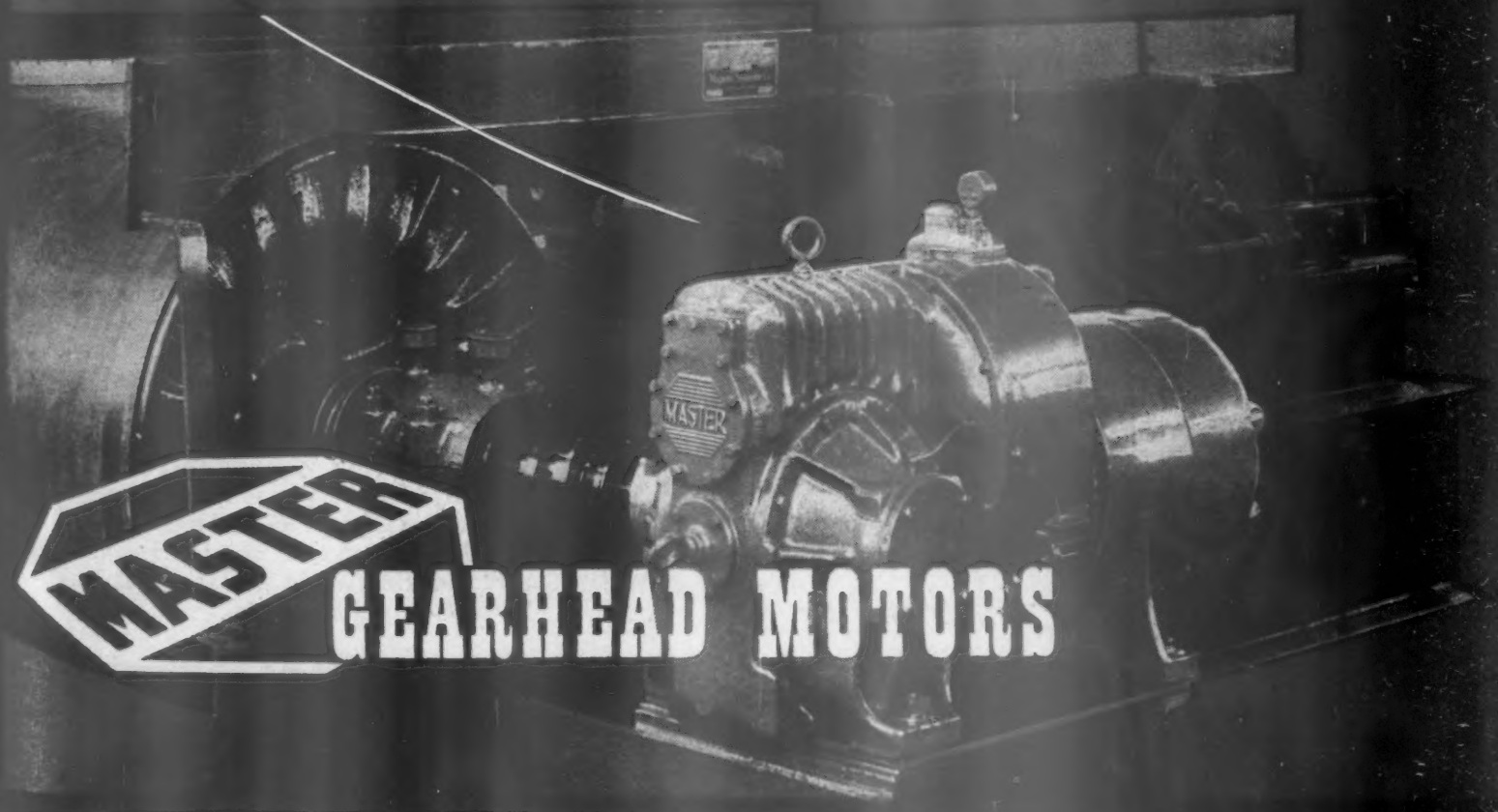
BIG ones or little ones

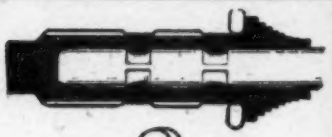


MASTER GEARHEAD MOTORS

A Good Turn For Everybody!

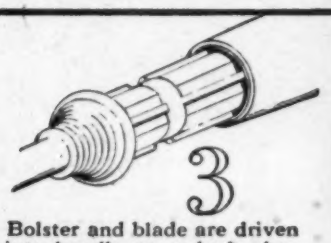
1

Blade tempered entire length. Recesses forged on end of blade which is driven into steel bolster.



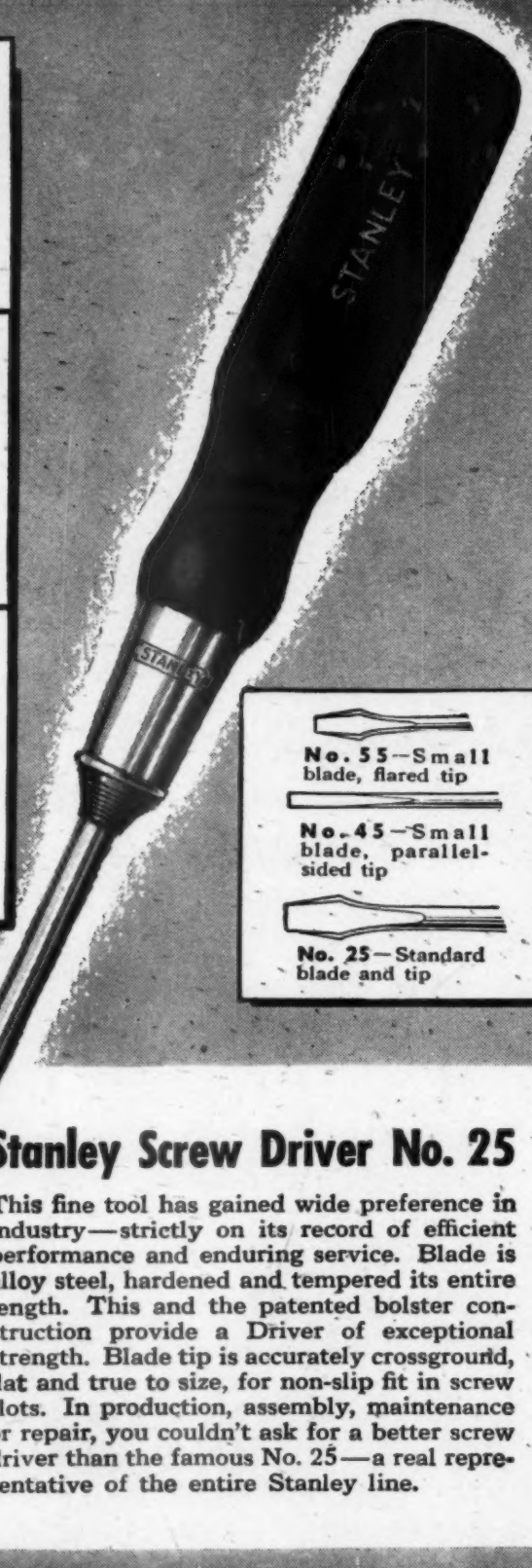
2

Bosses on bolster forced into blade recesses. Blade is now locked into bolster and can never be separated.



3

Bolster and blade are driven into handle securely by hydraulic press. Four wings lock into hardwood handle so blade cannot twist.



No. 55—Small blade, flared tip

No. 45—Small blade, parallel-sided tip

No. 25—Standard blade and tip

Stanley Screw Driver No. 25

This fine tool has gained wide preference in industry—strictly on its record of efficient performance and enduring service. Blade is alloy steel, hardened and tempered its entire length. This and the patented bolster construction provide a Driver of exceptional strength. Blade tip is accurately crossground, flat and true to size, for non-slip fit in screw slots. In production, assembly, maintenance or repair, you couldn't ask for a better screw driver than the famous No. 25—a real representative of the entire Stanley line.

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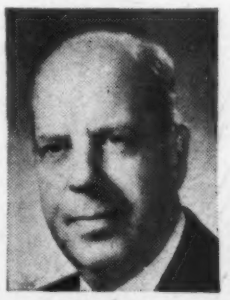
BEHIND THE BYLINE *(continued)*

Bell Telephone & Telegraph Company; then traveled three years for Alexander Hamilton Institute. In 1932 he started his own business with a new idea for producing automatic nailing machines for the shoe repair and woodworking industries. He is a director of the Atlanta Chamber of Commerce; charter member and first president of the Atlanta chapter of the American Society for Metals; director of the Atlanta Junior Achievement program; and a member of the Atlanta Area Committee for Economic Development.

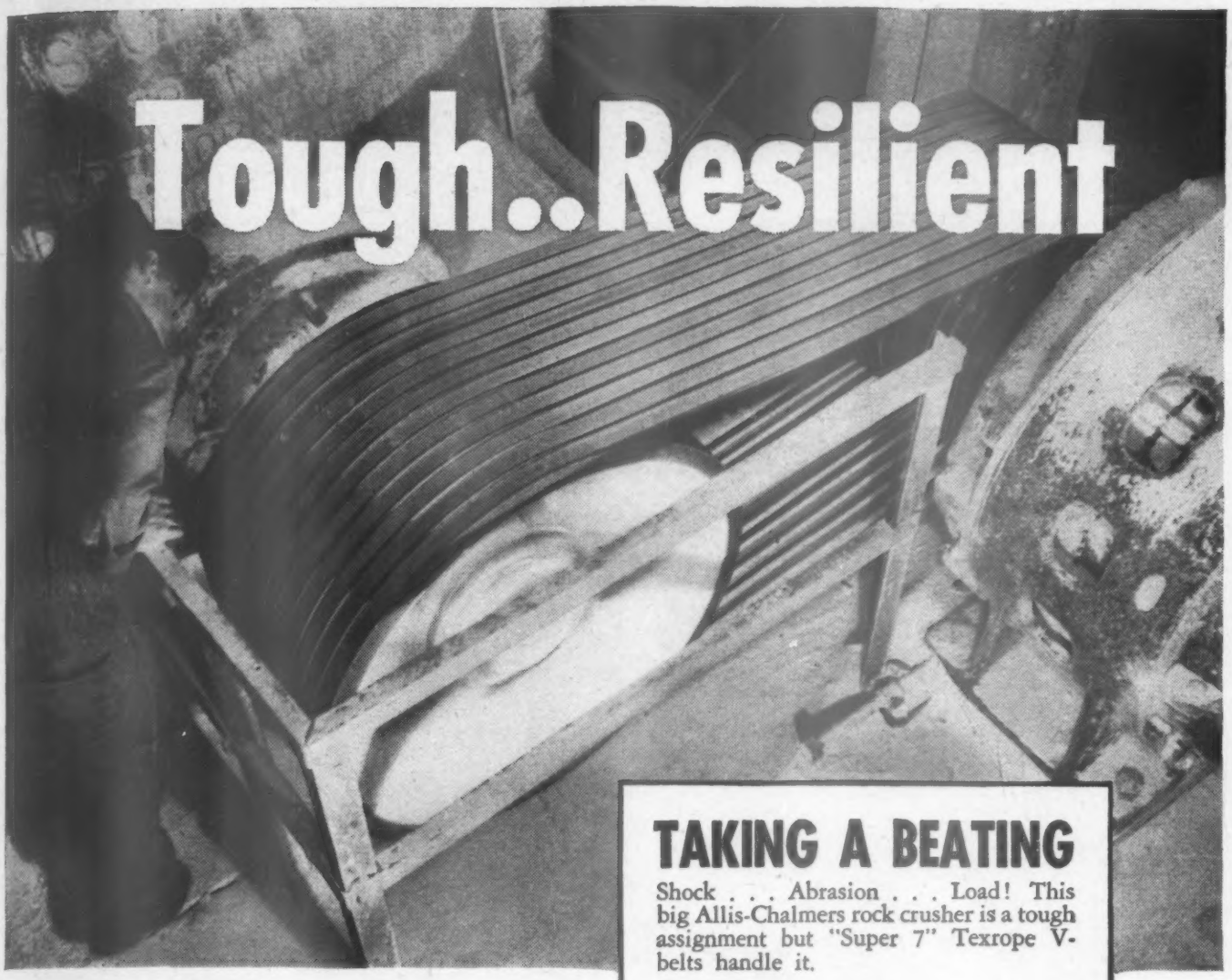
Alan Kahn (page 137) was graduated from Dickinson College with a B.S. degree in chemistry. His first job was setting up chemistry laboratory standards. He received industrial engineering training at Procter & Gamble; then worked for Steiner-Liberty Corporation as a time study engineer and plant superintendent. He was with The Budd Company as a time study engineer, and in 1939 came to Bendix, where he became supervisor of time study and, later, night superintendent. He spent two years aboard a PT boat in the Pacific. He returned to Bendix and is now supervisor of time study and assembly processing. He is a member of Phi Kappa Psi Fraternity and the Society for the Advancement of Management.

A Behind the Byline biography of Robert H. Heidrich (page 111) appeared on page 236 of the March 1947 issue of FACTORY, for which he contributed the article, "No Red Tape In This Maintenance System."

(Received too late for inclusion in the June issue)



William J. L. Roop (author of "Painted the Plant in Colors—Here's How," June, page 91) is a technically trained engineer of many years' experience. He has been identified with numerous major engineering projects and has wide experience in organization and administration with regard to technical matters. His present position is that of chief engineer with the Gillette Safety Razor Company. He served during World War II as a Colonel in the Corps of Engineers.



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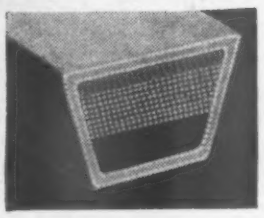

. . . You get 7 Great Features in "Super 7" Texrope V-Belts

1. TOUGHER COVER. Two layers of tightly woven long-staple cotton fabric and tough, wear-resistant rubber compound. Protects the belt carcass from grit, moisture and wear — holds its shape — assures maximum belt life.

2. SHOCK ABSORBING. "Super 7" belts combine great strength with the degree of resiliency necessary for long life and smooth power transmission.

3. HEAT RESISTING. *All* "Super 7" V-belts are designed and built to give high resistance to heat.

4. STRONGER CORDS. More cords—imbedded in cool-running rubber compound. A powerful load-carrying structure.

5. PRECISION CURED in pressure molds to assure accurate section and perfect bonding of cords, cover and cushion.

6. ACCURATELY MATCHED. Every belt weighed, measured and carefully inspected before being sized and packed.

7. ENGINEERING LEADERSHIP. "Super 7" Texrope V-belts represent 22 years of research and experience — by Allis-Chalmers, originator of the Multiple V-belt drive.

"Super 7" Texrope V-belts come in five types to meet every operating requirement: *Standard — Heat Resisting — Oil Resisting — Oil Proof* and *Static Resisting.* Call your Allis-Chalmers office or dealer. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

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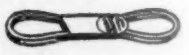
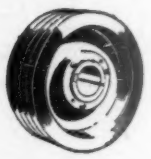
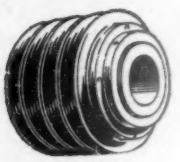


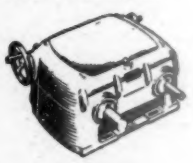
"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.



Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.



"Vari-Pitch" SHEAVES
Exact variations in speed, stationary or motion control.



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Speed variations up to 375% at the turn of a crank.

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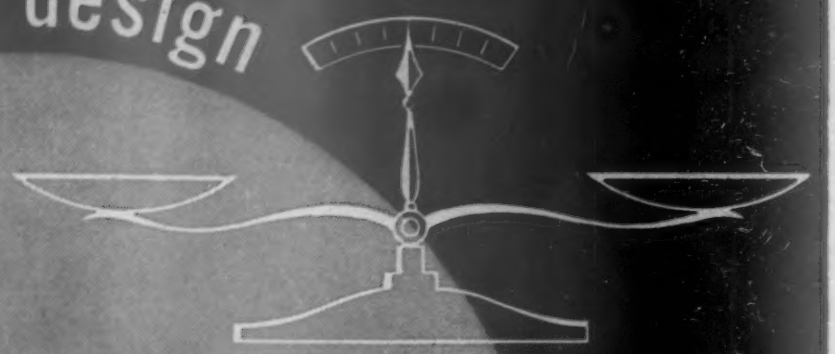
a feature of Gaylord balanced design



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125

70 years

We hesitate to prattle of yesterday but how else are we to emphasize that "Experience is the Best Teacher"? How else can we demonstrate that our acquired knowledge over a period of three score and ten years is still working for us here at Jeffrey? By having this heritage of years in the design, building and installation of material handling, mining and processing systems we think we are more qualified by experience to offer reliable cost reduction information today and tomorrow. Explore Industry on your own find out for yourself why Jeffrey equipment enters into so many modern programs why it has been selected on so many important jobs where a speed-up in production and cost reduction are in demand.

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3600 parts per hour – *automatically*

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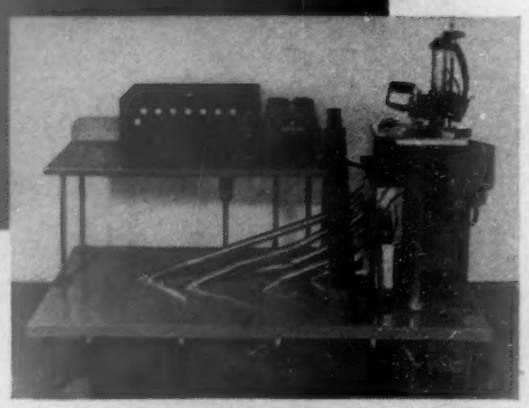
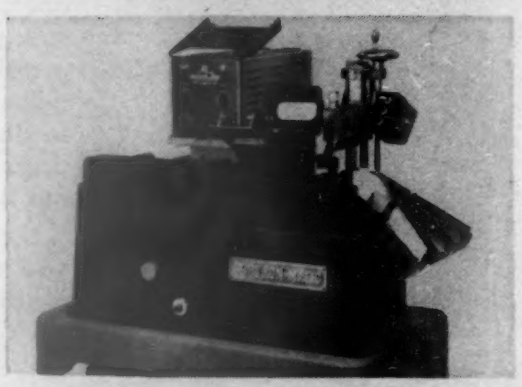
Visit Booth 47 — to see newest developments in Air, Electronic, Mechanical Gages.





Both diameter and length accurately sorted by *Electronics*

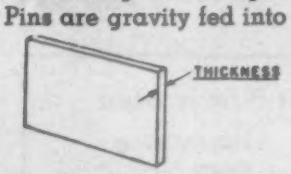
Imagine the economy and efficiency of sorting critical dimensions automatically by these *electronically* operated Gages.

3600 Esterbrook pen barrels are segregated into 8 size categories per hour. *Three times faster* than previous methods. Barrels which are too short and too long are rejected first. Those OK for length are then sorted into 4 acceptable diameters, differing by only .002". All over and under sized diameters are rejected. Barrels delivered into all categories are automatically counted: a tie-in with Quality Control. The economy of this Federal Sortron-Matic Gage has resulted in an order for a second with hopper feed.

Piston pins sorted to .0002" over entire length →

This Sortron-Matic Gage sorts centerless ground piston pin diameters into 3 categories — OK, oversize for refinishing, and rejected undersize. Each pin is gaged for diameter throughout its length, *spirally*. Both the gaging and the sorting are completely automatic. Pins are gravity fed into the Gage.

Thickness of thin sheet stock →



Thin sheet stock is automatically sorted into 10 categories differing by .00025" in thickness; 8 acceptable thicknesses plus over and under required thicknesses. The operator merely places the pieces between contact points. The Gage automatically delivers them to 10 bins according to their thickness. All Sortron-Matics can be arranged to count.

* * *

If you have much 100% inspection or sorting, it will certainly pay you to investigate the possibilities of a Federal Sortron-Matic. Write to Dept. 54 for further data.

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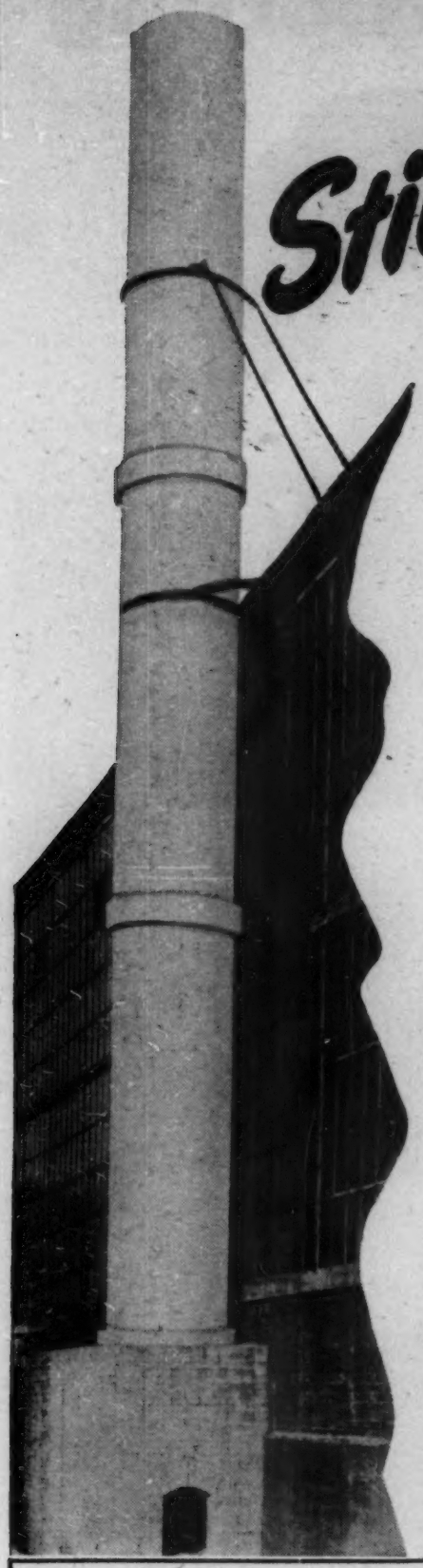
● Dimensional Dial Indicators and Indicating Gages — mechanical, electronic, air, multi-dimensional • Automatic Sorting • Dimensional Machine Control • Combinations of these methods.



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For more than 15 years, this Transite stack at the Waterbury, Connecticut, plant of the Chase Brass and Copper Company has been exposed to conditions so severe that the pipe previously used had to be replaced at frequent intervals. Its interior is constantly subjected to the destructive action of corrosive acid fumes . . . its exterior to the aggressive attacks of weather. Yet despite this double-barreled attack from corrosion, it has required but very little maintenance *and is still on the job today.*

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Bleaching	Explosive	Laundry	Quarrying	Soap
Boiler Works	Farm Machinery	Leather	Railroad	Soft Drink
Brewing	Food	Meat Packing	Rayon	Sugar Refining
Canning	Foundry	Metal	Refrigeration	Textile
Ceramic	Furnace	Mining	Rubber	Tool
Chemical	Furniture	Paint	Sewage Works	Water Works

Johns-Manville TRANSITE Industrial Vent PIPE

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ARTHUR L. ABBOTT. McGraw-Hill Book Co., 330 West 42nd St., New York 18. 633 pages. Photographs, sketches, diagrams, tables, cross and subject indexes. $4.

Sixth edition, based on the 1947 edition of the National Electrical Code. The purpose of this book is to explain the Code requirements, both for general use as a reference, and as a text. The rules are presented with detailed discussions, so that their practical application may be clearly understood.

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The first of three "Working Manuals for Motor Repairmen," this book presents a wide variety of types and makes of electrical motors and generators as preparation for the following two manuals, which will deal with d.c. and a.c. armature winding. Theory has been kept to a minimum, and the descriptive text is illustrated with views of several makes of the same machine so that the structural differences may be noted.

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Practical answers to everyday problems relating to the electrical power factor, written in language that the average worker can understand. Sketches and diagrams illustrate the text, which consists of answers to questions asked by "Joe," the typical maintenance man.

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Compiled from ideas sent in by members of the National Office Management Association. McGraw-Hill Book Co., 330 West 42nd St., New York 18. 272 pages. Photographs, sketches, diagrams, figures, $3.50.

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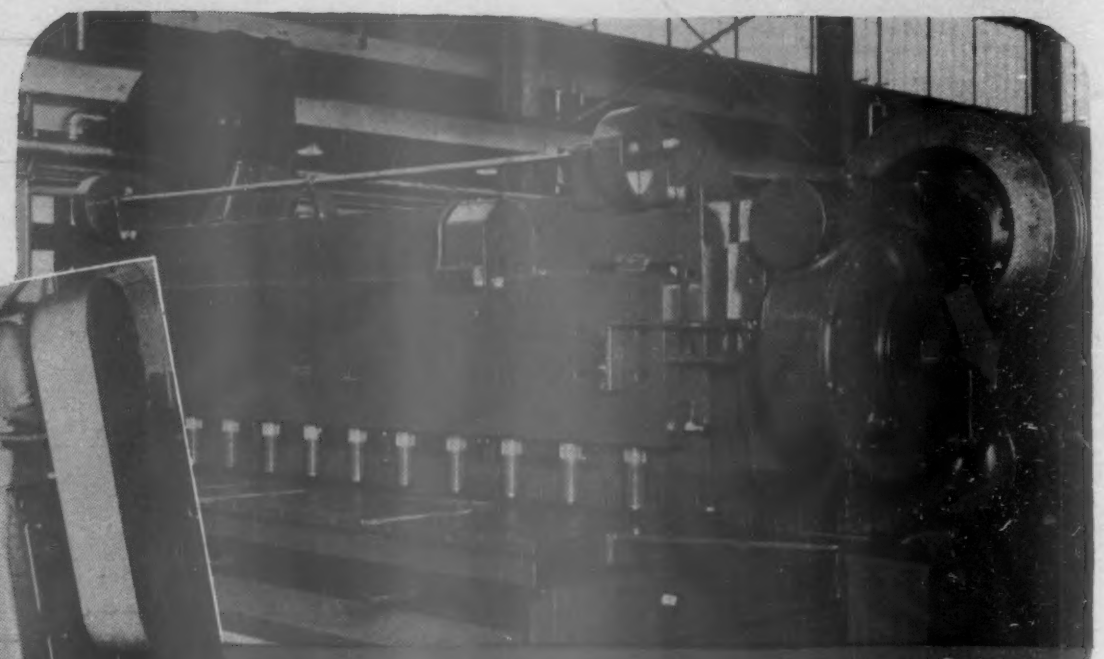
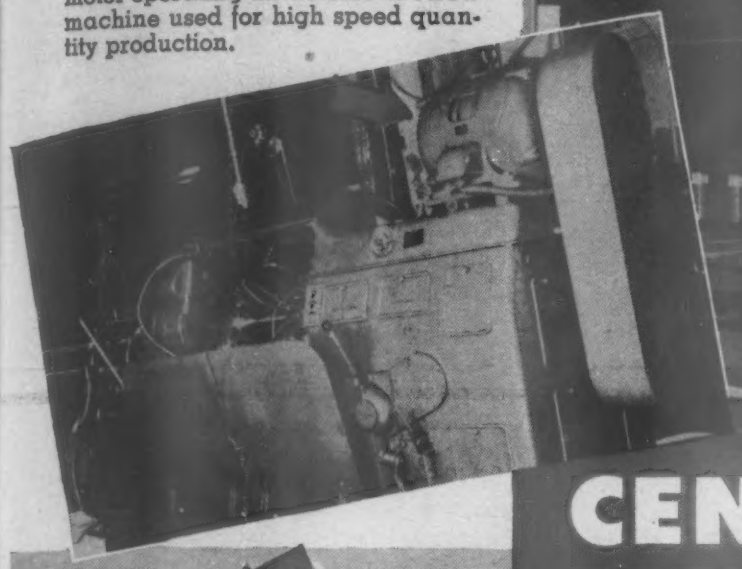
At right — Century 30 Horse Power high torque, high slip motor operating a heavy duty shear. High slip motor reduces the shock loads when shearing heavy plate.

Below — Century 20 Horse Power motor operating an automatic screw machine used for high speed quantity production.





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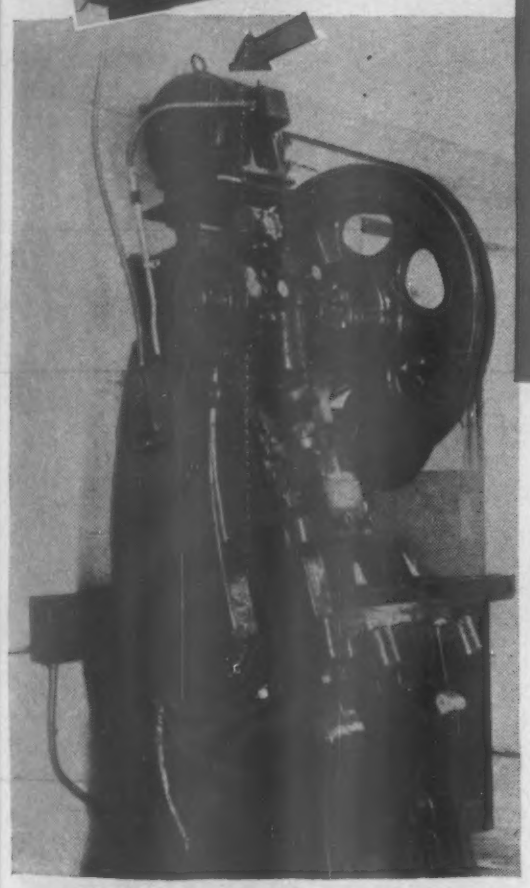

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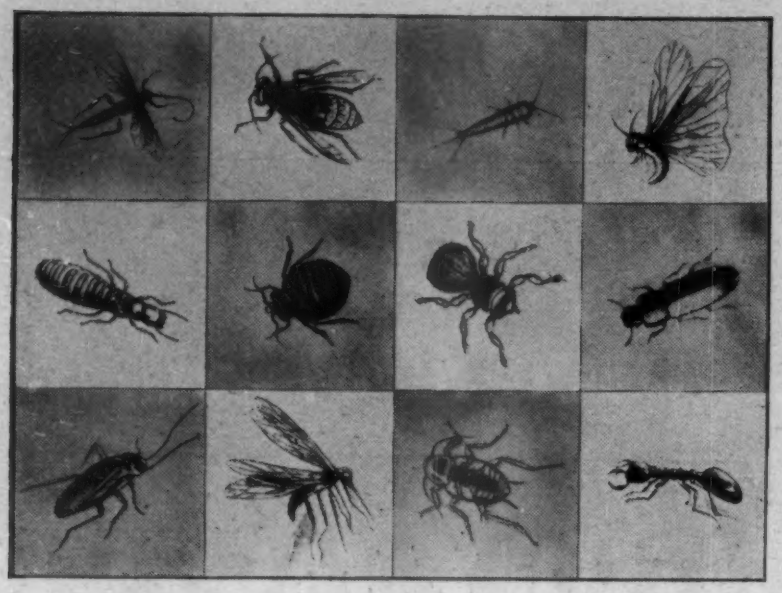

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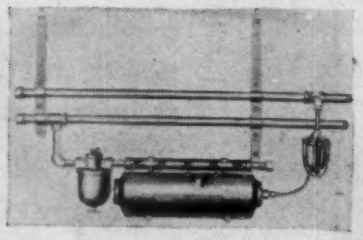

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DISCIPLINARY CLAUSES IN UNION CONTRACTS. Francis Odell. Circular No. 13, Industrial Relations Section, California Institute of Technology, Pasadena 4, Calif. 8 pages. No charge for single copies; quantity prices on request.

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AMERICA'S STAKE IN WORLD TRADE. Gloria Waldron and Norman S. Buchanan. Public Affairs Pamphlet No. 130. Public Affairs Committee, Inc., 22 East 38th St., New York 16. 32 pages. Sketches, charts, bibliography, list of visual aids. 20c.

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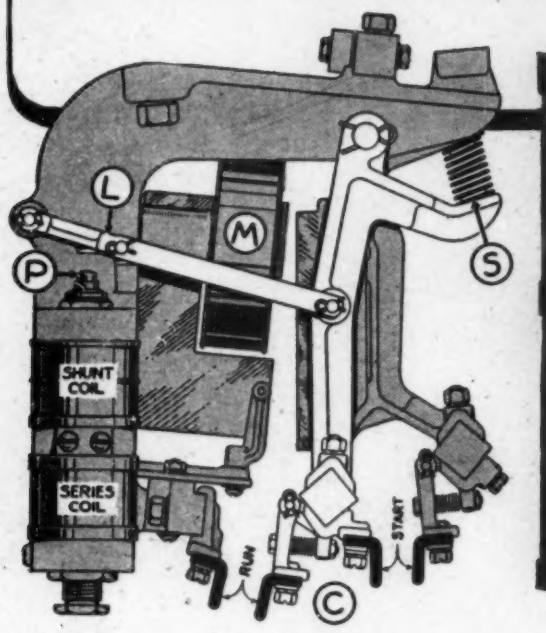
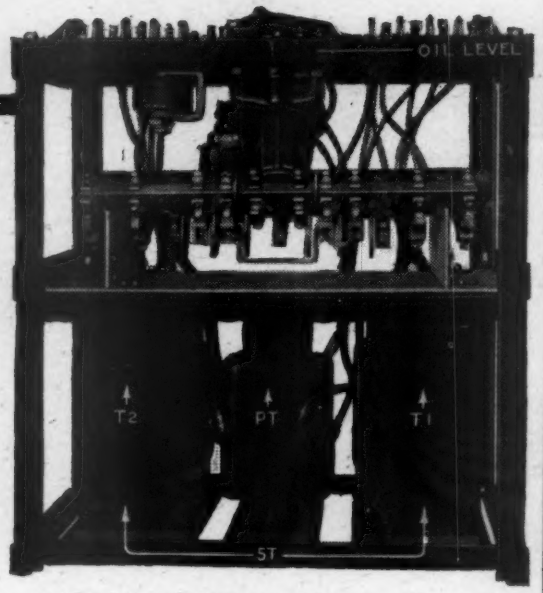


Side view of Contactor.



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MANAGEMENT AND HUMAN RELATIONS IN INDUSTRY. Paul Anderson, General Editor. First of three volumes of The Labor and Industrial Relations Yearbook and Directory for 1947. Industrial Relations Publishing Corp., 1165 Broadway, New York 1. 103 pages. Photographs, graphs, tables. $2.

DEVELOPING MORALE: The Executive's Most Important Responsibility. George D. Halsey. Reprinted from *Personnel*. American Management Association, 330 West 42nd St., New York 18. 12 pages. 15c.

ROLE-PLAYING IN SUPERVISORY TRAINING. Leland P. Bradford and Ronald Lippitt. Reprinted from *Personnel*. American Management Association, 330 W. 42nd St., New York 18. 14 pages. 15c.

ADMINISTERING THE OFFICE UNION CONTRACT. Office Management Series No. 116. American Management Association, 330 West 42nd St., New York 18. 30 pages. 75c.

ON THE CALENDAR

JULY

23-26, Silver Bay Conference on Industrial Relations, 29th Annual Conference, Silver Bay-on-Lake George, N. Y. William F. Meyer, Jr., Secretary for Industrial Services, 347 Madison Ave., New York.

AUGUST

26-29, American Institute of Electrical Engineers, Pacific General Meeting. San Diego Hotel, San Diego, H. H. Henline, Secretary, 33 West 39th St., New York.

SEPTEMBER

1-4, American Society of Mechanical Engineers, Fall Meeting, Hotel Utah, Salt Lake City. Ernest Hartford, Executive Assistant Secretary, 29 West 39th St., New York 18.

8-12, The Instrument Society of America, Second National Instrument Conference, Stevens Hotel, Chicago. Richard Rimbach, Executive Secretary, 1117 Wolfendale St., Pittsburgh.

15-19, Illuminating Engineering Society, Annual Conference, Hotel Roosevelt, New Orleans. A. D. Hinckley, Executive Secretary, 51 Madison Ave., New York.

15-19, American Chemical Society, Fall Meeting, Hotel Pennsylvania, New York. Alden H. Emery, Secretary, 1155 Sixteenth St., N. W., Washington 6, D. C.

17-26, National Machine Tool Builders' Association, Machine Tool Show, The